MODEL AIRPLANE NEWS

AUGUST 1950 - 25 CENTS

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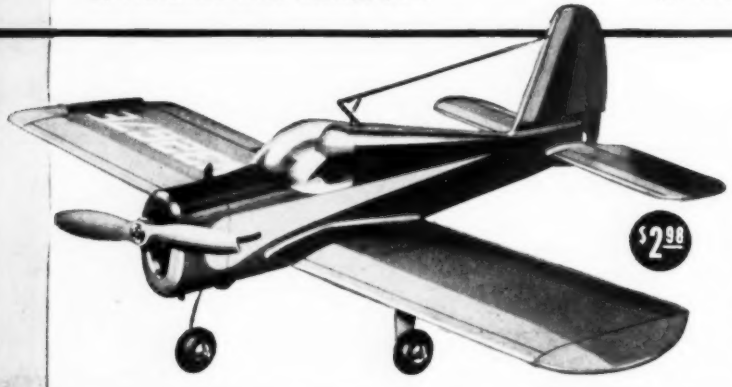

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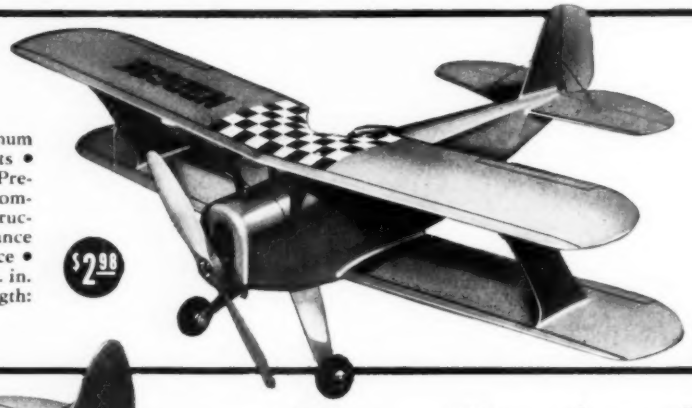

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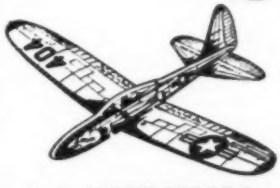

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AUGUST 1950 **VOL. XLIII—No. 2**

CONTENTS

Cover Design by Jo Kotula

CONTROLINE SCALE
Model Pitts Special 11

CO2 POWER
Mexican Veloz 15

TOWLINE GLIDER
Tomahawk 19

CONTROLINE STUNT
Flapjack 23

BEGINNERS' GLIDER
Wee Floater 31

PLANE OF THE MONTH
The Little Stinker 21

SCIENCE
Strictly Solid 13
Design Forum 27

WORLD WAR I
Sopwith Pup (Part One) 32

THREE VIEWS
Pitts Special 20
Consolidated PT-3 26

NEWS
Scrap Box 2
Flash 7
Report From The West 8
Public Recreation Areas 17
Air Ways 28
Hobby Counter 33
News of Modelers 40
Club News 40
Coming Contests 42

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By BILL WINTER

THE excitement over O & R's Fifteenth Anniversary brings back a lot of memories. Do you remember their *Gold Seal* engine? The *Ohlsson 23* goes back more than eleven years; wasn't the *23* the big thrill at one of those Detroit Nationals? Anyway, it was a Nationals distinguished by the then incredible scream of the *23* in various hotel rooms. The hotel business must have been pretty bad, for the management was glad to hear all the *23's*. Late one night we were leaning exhausted against the door of Gordon Light's room, trying to talk above the din of a nearby *23;* we'll never forget the sudden silence when that engine stopped—almost sagged to the floor! The term "23" caught on like "60," or "29." But while a ".19," a ".29," or a ".60" meant the borderline of a class of engines, and might refer to any make of engine, the extremely familiar term *23* meant just *one* engine, and not a class designation at all.

Really violent has been the Wakefield enthusiasts response to the arguments about the four-minute job in the last few columns. No one need worry about the fortunes of rubber. Brother, these fellows really get up on their hind legs. In fact, so many letters have come in from national experts, putting out the facts you never see in articles, that this foxy old-timer is tempted to make up a portfolio marked *Wakefield Secrets.* Other things being equal, the difference between a run-of-the-mill job and a high-scoring crate is prop and motor. The ship should not be ladylike when it comes to climb. Hal Roth, a pretty fair flier, has been learning the Wakefield secrets the hard way. Fortunately, he is surrounded by *Thermal Thumbers,* which shortens the suffering considerably. Even so . . . "In the past year I have made seven Wakefield ships and what have I learned?" he asks. "Plenty about construction, design, and that weight business. Up to the seventh ship, design was ordinary: a short fuselage of 31", a 16" prop with 22" pitch, 14 strands of 1/4" black rubber (doesn't correspond with T-56, as strand is thicker), pop-up wing dethermalizer (in real thermal country it is found that pop-up tails just waste their time popping), and two-wheel gear. It would fly well when trimmed right and in fair weather would occasionally hit 3 mins. The motor ran 45-50 secs.

"I was ready to give up and forget those blasted Wakefields," goes on true-confessions Roth. "I made a miserable showing at the first meet after 20-30 Sundays of practice. One of the club members told me to scrap the design and start from scratch with two things in mind: light weight and a tremendous motor. My new ship: twin-tails, R.A.F. 32 airfoil at 4°, single wheel, only 22" between rubber stations, and a large free-wheeler of higher pitch. Without rubber, it weighs 3.8 oz. The old ship was 5.5. To reach the weight limit, I had to pack in 16 strands of 1/4" black, 50" long. On 750 turns the run was over a minute. The climb was fast and it kept going to the final turn (that's the acid test!).

"Why all the difference? First, with twin tails the C.L.A. was lower, the weight was lighter with regard to structure and the power much greater—about equal to 22 strands 1/4" T-56."

Hal tells about a revolutionary prop produced by Lo Salisbury, said to be a real hot Wakefielder out thataway. Don Donahue mentions Lo, too, saying that he lost out on the Eliminations last year by getting a right-glide turn matched up with left-hand thermals. Bet you hadn't heard that one, but it's so. Thermals that revolve the other way will soon bounce the ship out again. Anyhooo, the prop block is 17" x 2" x 1-1/2" but it is blanked out by scribing diagonals from corner to corner indoor style, leaving 3/8" at the hub. There is no cutting in from the side view of the blank—it is still 1-1/2" wide from tip to tip. When the back of the blades are cut you start to trim from the side profile, to leave the hub 1/2" thick. The front of the prop is not cut at all. The blade pattern is square at this point. Working from a center line scribed on the back face, cut the blades 2-1/8" wide and leave the tips only slightly rounded. That wording, men, is straight from the horses mouth. The pitch is said to be 26.7", but a 1-3/4" thick improvement will give the desired still higher pitch. Salisbury uses a P/D of 2 to 1. Lots of power is required, but the prop turns slowly.

We recall in experimenting with the *Eureka,* that 8.3 oz. gross, a 36" pitch, 18" was, of course, underpowered and that adequate power would have killed the glide due to higher gross weight. With conventional motors and fairly light structure (almost 50-50 weight to power), 28" pitch worked out fine. There is an interesting angle to this low C.L.A. argument. Boiling down our recent observations pertaining to rubber models (and including observations on free flight gas, too) we recall that about three years ago, Charlie Grant propounded an idea that if you located two C.L.A.'s, one for the forward profile area and one for the rear profile area, and drew a line between the two, you could determine whether or not your ship would roll nose-up or down on the turn. If the line inclined upward toward the nose, you were in business. Charlie, this is too much, we said to ourselves at the time, but on the heels of that came a long letter from a full size plane designer, one of our guided missile brains during the war, who mentioned application of the same principle to a highly experimental plane which is now flying. During all this time, note had been taken of the British modeling use (in some quarters) of what they termed "anti-spin fins," really small sub-rudders stuck under the stabilizer, as used on many of our American free flights. These fins were credited with enabling spirally unstable Wakefields to fly in the groove. Critics, however, said the fin area simply had been too small in the beginning. Only recently, Paul Gilliam emphasized the same thing when he explained the peculiar profile of the Civy Hearse as an attempt to get pylon characteristics from a cabin model. Now, to apply Charlie G's brainstorm to the pylons, the line drawn through the two C.L.A.'s certainly would incline upwards and, in fact, pylons want to roll nose-up unless you over-control them. Out of curiosity, we have tried the low-rear profile idea on cabin rubber jobs and all of them quickly get their noses up after leaning over in the first high-powered bank. Hal Roth's comment on his new ship is another indication of the connection between theory and practice.

Speaking of theory and practice, we have been getting a kick out of the latest battle of the airfoils. Actually, all indications are

(*Turn to page* 34)

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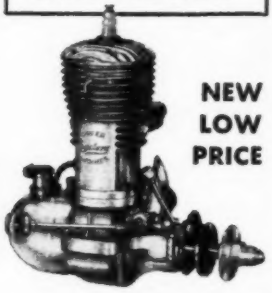

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Baby Clown 22" AA		1.50
Baby Dit-Dee 21" AA		1.95
Baby Era 18" AA-A		2.50
Baby Era Rise 16" AA		2.50
Baby Sky Box 36" A-B		2.98
Baby TC-2 Trainer 18" AA		1.98
Baby V Shark 20" A-B		2.96
Bootcheat 24" A-B		3.98
Bum Howards Pets 30" B-C-D		5.96
Berkeley Controliners:		
Bat 32" C-D		2.00
Bearcat 35" C-D		2.00
Bee 24" B		1.50
Bug 17" A		1.00
Buster 24" B-C		2.50
Hawker Sea Fury 24" A-B		2.50
Key 29" B-C		4.95
Lil Duzer Zilch 42" A-B		3.96
Minicro 28" A-B-C		4.98
Navaon 25" A		2.50
P47 Thunderjet 40" C-D		3.98
P51 Mustang 37" A-B		4.95
PurWee Zilch 32" A-AA		2.50
Super Duper Zilch 52" C-D		5.96
Swee' Pea Racer 24" A-B-C		2.50
Big Cub-up 48" B-C		5.98
Blue Stunt Train. 22" B-C-D		3.96
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Butch Trainer 28" B-C-D		3.95
Chanea 36" B-C		4.98
Chief 31½" A-B-C-D		5.96
Chupp Autogiro 34" B-C-D		4.95
Cyclone 26" B-C-D		4.96
Di Dee 28" A-B-C		3.96
Dmeco Spl. 24" C-D		7.96
Dmeco Spl. Jr. 16" A-B-C		3.95
Dynamic 26" A-B		3.50
Flower 24" B-C		3.98
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Flying Circus 28" B		2.75
Flying Circus Jr. 16" AA		1.50
Flying Clown 28" A-B-C		1.96
Flying Saucer 18" A-B		1.98
Freshman 9 24" A		2.48
Freshman 19 30" A		2.98
Freshman 29 36" B		3.48
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Heli—Racer 16" A		6.95
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Hovered 'Em 24" B-C		2.98
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Junior Stunt 9 27" AA-A		2.48
Junior Stunt 19 24" A		2.98
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Little Dipper 24" A		1.98
Little Ripe 16" AA-A		1.50
Little Devil 18" AA-A		1.95
Little Nobody 24" A		4.95
Little Schnee 17" AA		1.50
Mighty Mite 18" AA-A		1.95
Mini-Zilch 19" AA		1.25
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Pee Wee Pup 17½" AA		.75
Pee Wee Pursuit 16" AA		1.00
Phantom Era 28" A-B		2.96
Piper Cub Comet 36" A-B		2.95
Piper Cub Monogram 35" A-B-C		4.95
Piper Vagabond 36" A-B-C		3.98
Pirate 40" B-C-D		3.96
Pony 15" A-B		1.95
Presto Liner 29" A-B-C		6.95
Primer 18" AA		1.25
PT Trainer 36" A-B		3.98
Puddle Jumper 19" AA		1.00
Rookie Jr. 18" AA		1.50
Rookie Trainer 36" A-B-C		3.96
Sedor Puddlejumper 25" A-B		1.95
Sharpy 47" C-D		4.95
Sky Bee Trainer 36" B-C-D		3.96
Sky Box Stunt 42" B-C-D		3.96
Snorky 26" A-B-C		1.96
Sophomore 9 28" A		2.48
Sophomore 19 32" A		2.98
Sophomore 29 39" B		3.48
Speedster 12" AA		2.25
Speedwagon 19" B-C" A		3.98
Speedwagon 30 18" B		3.96
Speedwagon 19" C-D		4.98
Sporting 36" A-B-C		3.95
Spray 30" B-C		4.95
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Streamliner 25" B-C-D		4.00
Stunt Ace 40" A-B-C		3.95
Stunt Raid 16" AA-A		1.50
Stuntmaster 40" B-C		4.98
Stuntwagon 30 44" B-C		4.95
Stuntwagon 19" D		7.95
Super Bips 28" B-C-D		4.96
Super Cinch 36" B-C		2.96
Super Sky Box Stunt 47" C-D		5.96
Super Snorky 40" C-D		2.96
Super Solution 18" A		2.25
Super Spirit 21" (Jet)		4.96
Sweet Chariot 18" AA-A		2.50

BURIED IN THIS AD are most of the new items. Sometimes there isn't time or space to include them. But, if available, we have it.

T-28 N.A. Trainer 36" B-C		4.95
Taylorcraft 36" A-B-C		2.96
Texan Jr. 38" A-B		2.50
Texan Sr. 56" C-D		2.96
Topper II 19" A-B		2.98
Topper III 29" B-C		3.00
Trail Blazer 36" B-C-D		3.96
Trainer 30" B		2.50
Traster Babe 29" AA		1.00
Traster Invert Jr. 40" A-B		2.96
Traster Pixilie 32" A-B		1.98
Traster Pixilie 36" B-C		2.95
Traster Twin Pixilie 47" B-C		3.96
Turbotte 39" C-D		6.95
Tuffy 24" AA-A		1.96
Waco 33" B-C		4.95
Warrior 36" A-B-C		3.98
Wee Willie 18" AA-A		1.95
Whirlwind Sr. 90" B-C-D		7.96
Wildfire 28" B-C-D		3.96
Wing Ding 16" AA-A-B		2.00
Wing Dingus 16" AA		2.00
Zing 24" B-C-D		3.96

ACCESSORIES

FUELS (Continental U.S.A. Only)

For Ignition	Pts	Qts
Ohlsson #1, 03	.70	1.40
Power Mist #5	.70	—
Sig. Pink	—	1.26
For Glo		
Ohlsson #2, #4	.75	1.40
Ohlsson #3	.75	—
Ohlsson #2 or #4 Extra	.40	—
Powermist Glo	.80	—
Powermist Spitfire	.80	—
Sagenor Glo	.50	—
Red Devil	.60	1.10
Testors 39	.75	—
Thymplex	.75	—
Ranger AA	.50	—
Spitfire AA	.50	—
Blue Ribbon #1	.65	—
Blue Blazer #2	.70	—
OK Cub	.70	—
For Diesel		
Drone	—	1.00
Ranger (Fixed Head)	1.00	—
Ranger (variable head)	.85	—
Pouring Spout For pint cans	.10	
Hot Fuel Proofer	.35, 35 & .45	

PROPELLERS

Buzzard 9", 10" in 12", 14" p 11" in 16", 12" pitch 6ve for 1.00

Excel 5-blades 8, 9, 10, 11" in 8p; 8, 9" in 10p 1.30

Rite Pitch Stunt 9, 9, 10, 11, 12, 13, 14 in., 6 and 8 pitch .35

Rite Pitch 8, 9, 10, 11, 12, 13, 14 in., 6, 8, 10 or 12 pitch .35

Super Spl. 8", 9", 10", 11" in 6 & 8" p .35

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RUNNING & TEST BLOCKS

E-Z Running Stand 1.25
Universal Running Blocks 1.00
Wright Test Block 5.95

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#1—1½x1½x3½ Stunt
#2—2½x2½x3½ Stunt
#3—2½x2½x4½ Stunt
#4—4½x1½x3½ Stunt
#6—1½x2½x4½ Stunt
#12—2½x2½x5½ Stunt
#15—2½x2½x8½ Half R.

Presto: 1½x2½ or 2 hor. or ver. .75
1½x2½x2 Sq. .90
1½x2½x2¾ Wedge .90
1½x2½x3½ ½-Rnd Stunt .90
Misc. 80c & 1.00

FLY TANKERS

A & B—1.00; C & D 1.50

Deluxe 2 16" shaft—1.25, 1/4" shaft—1.50. 5/8" sh. 1.75

IGNITION COILS

Aero Featherweight 2.50
Aero Qual. 1.50 Regular 1.50
Arden 2.50 Rogers 2.00
O.K. 1.50 Wilco 1.95
O.K. Twin 3.50 Winston 2.00

Smith Comparator — 1.95, Firecracker 2.75—Dual 4.50

CONDENSERS

Regular — 20 .. Smith Metal .85

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Arden Glo (1/2 or 1/3) .65 & .85
Arden AA .49
Champion Glo V, V2, V3 .75
Champion V, V2, V3, VR1, VR2 .50
Infant Glo-plug (spl) .65
McCoy Hot Point .49
Ohlsson Glo (V, V2 or AA) .49
Ohlsson Economy V3 or AA .39
O.K. Glo-plug (V3 or V5) .49

Plug washers .05

IGNITION ACCESSORIES

6 ft. Hook-up wire .35
Alligator clips .39
Arden Booster Jack 1.75
Austin Booster Plug-in .50
Midget S witch, slide—30c Turn .50
Ohlsson Snap-Pack .35
Arden Battery Cord Kit .35

PROP SPINNERS

Adapter Nuts (state eng.)
¼"—20c; 1¼"—20c; 1¼" .45
1⅛"-48c; 1¼"-.90c; 2"-.90; 2⅛"-1.00
2" Needle Nose 1¼" dia. 1.15
2" 1.20

Plastic 1½" .50
Scamper Plastic 1½", 1¾", 2", 2½" .40

WHEELS

Semi Pneumatic (pr) 2" .85
2½" — 1.00, 3" 1.50
Sparky Tail Wheel Assembly .25
Sponge Rubber, Dural hub (pr)
½"—20c, 1.1¼"-25c, 1¼", 1¾"-.30
1½"—40c, 2"-.50
Sponge Rubber, Wood Hub (pr)
2"—40c, 2½"—50c, 3½" .60
Tail Wheels ½"—10c; 1½" .15
Treater Pneu. (pr) 1½" or 1½" .40
1¾", 2"—50c; 2¼", 2½"—60c; 2¾" .90
3"—1.25, 3½"—1.50; 4½" 1.75

FLIGHT TIMERS

Austin metal 1.50
D-E Shut-off Valve .50
Dime (qrs or gld) 1.95
Hillcrest pionier 1.25
Stattler-off Valve .75

AA ACCESSORIES

Shut-off Valve (state engine) .85
E-Z Mixmount .85
.003 or .005 x 2—50 .50
Spinners (state engine) .60
Presto Starter (state engine) .25
Props (state engine) .25
Tanks (state engine) .50, .60, .75
Neoprene (fit) .20
Needle Meter .50

MISCELLANEOUS

Batt. Box Pen. and Medium .60
reg. .50
Brass Tubing 1/16", 3/32", 1/8" .15
Coil Holder .15
Copper Tubing ¼" OD, per ft. .20
Fish-fit .45
Finger Guard .40
Fuel Line Filter .35
Fuel Pump .65 & .89
Metal Motor Mounts, Sm—50c; Lg. .50
Metal Prop Can 75c & 1.50
Needle Valve Exten. flexible .25
Neoprene Tubing, per foot .20
Transparent .15 AA Transparent .20
No. 70 oil, 3 oz.—25c; pint .60
Plastic Fuselage 19" set of 2 .50
Plug Wrench, 3-way—15c; 4-way .25
Plywood (4 1/2" x 11") 1.25
1/16"—25c; 1/8"—30c; 1/4" .35
Silk per yard 1.50
Stitapon, light 18"x24" (white) .05
heavy 24x36" (white) .10
Red, Blue, Yellow 24"x36" .10
Socket Plug Wrench, 4-way .50
Soldering Set 2.25
Spanner Starter 5.00
Tissue (most colors) 20"x24" .05
Universal Needle Valve .50
Flexible .75
Vibrator 2.00

U-CONTROL ACCESSORIES

Adjustable Push Rod set .25
Aristrol Plastic Handle .75
Bellcrank 2"or 3"—10c, 4" .15
BERKELEY control lines
.009, .011, .014 3-70' .65
2-150' 1.00
Stranded .018, .021, .55 .75, 70'
1.00, 200' 2.75
Berkeley Metal Flight Reel 1.25
Berkeley Metal Handle 1.00
Elevator control horn .10

Plastic Balsa, 4 ozs. .79
Thinner, 4 ozs. .49

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Clear Dope .... 4 oz. 30c, pint 90c
Colored Dope .. 4 oz. 35c, pint $1.00
In: Light Blue, Dark Blue, Silver, Green, Yellow, Gray, Black, White, Red, Olive Drab, Brown, Cream and Orange.
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Cement or Thinner .... pint, 90c

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.010, .012, .014, .016, .018, .020 dia. 2-70' lines .85
Flexible 2-52' 1.50, 2-70' 1.95
Pylon Control line Reel 1.00
Reel Pal Reel 1.00
Simplex Handle & Reel 1.25
Stunt Bellcrank & Elev. Horn .25
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Take-off Dolly kit 1.00
U-Reely Contr—7.50; cable .. 8.50
U-Reely Remote 12.50
Veco Bellcrank .20 & .25
Wood Control handle .25

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Cement in tubes .10, 15 & .25
CONSET DOPE: (.10 and .20)
Fire Red; Sunshine Yellow; Horizon Blue; Jet Black; Regal Maroon; Silver; Insignia Top Coat; Thinner; Banana Oil; Midnight Blue; Radiant Orange; Bright Green; Snow White; Dunky Gray; Rich Gold; Aircraft Cream; Sanding Sealer; Clear Dope.
AERO GLOSS
Colored Dope, 4 ozs. .60
Silvaire Aluminum, Taylorcraft Cream; Corsair Blue; Fokker Red; Lambert Gray; Cub Orange; Stinson Green; Swift White; Stearman Red; Cessna Gray; Cub Yellow; Cessna Green; Jet Black; Waco Maroon; Curtiss Blue.
Clear Dope, 4 ozs. .84
Balsa Filler coat, 4 ozs. .60

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Chris-Craft Runabout 25" B-C-D	3.50
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Owens Yacht 26" B-C-D	3.50
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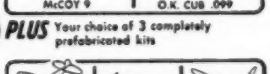

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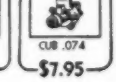

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THE FIGURES now available on the 1950 fiscal year aircraft procurement program indicate that, although the huge Convair B-36 bomber costs the most money per airplane of any ever built, actually the most expensive airplane for its size is the North American F-95A all-weather fighter, which costs $138 *per pound* (compared to only $57.50 for the B-36)! Another expensive item in the aircraft buying picture is the McDonnell F2H-2 *Banshee* Navy jet fighter, which costs almost $100 *per pound* of airframe weight! The reason for these high costs are many but both of these expensive little aircraft carry several thousand pounds of complex and expensive electronic equipment. While the B-36 and most other aircraft also carry radar equipment, perhaps even the same or greater quantity, the proportion of such equipment is small in comparison to the heavy airframe weight of bombers. It is interesting to note that the aircraft manufacturer actually receives only about one-half of the value of the contract, the other half going to engine, electronic and equipment suppliers. Cheapest airplane to buy these days is that old reliable the Vought F4U *Corsair*, which costs only $22.80 a pound (compared to about 50c a pound for popular-priced automobiles!).

IT LOOKS LIKE all military aircraft are going "sweep" these days, with the famed Republic F-84 *Thunderjet* being the latest. Republic engineers have added sweep-back to the wing and tail of this rugged fighter, resulting in such increased performance that the Air Force thinks of it as a brand-new airplane and calls it the XF-96A. The new jet fighter is powered by an improved Allison J-35-A-25 turbo-jet engine of 5,200-lb. thrust. Because a swept-wing must be stronger than a straight wing (and because it is usually thinner), the new XF-96A wing is much heavier than the standard *Thunderjet* wing and the new fighter weighs as much as a Douglas DC-3 transport!

BOEING AIRPLANE Company, looking ahead to the problems of jet transport operation, has designed a small "ground tug" to be used for towing the jet transport out to the take-off position. You may wonder why all this is necessary since it only takes a few seconds for the typical air line transport of today to taxi out to take-off position. But a jet transport would expend about 150 gallons of fuel in just moving from the ramp to the take-off runway! This is equivalent to five extra passengers, or about $750 in revenue on a transcontinental trip! Boeing's little one-man tug uses the well-known small auxiliary turbine engine developed by the company and which recently powered a huge trailer-truck.

DESPITE FIVE years of aircraft production by the major nations of the world, the good old Douglas DC-3 and DC-4 are still carrying most of the world's air commerce. A recent survey by the Civil Aeronautics Board showed that 78% of the aircraft used by the world's air lines (excluding Russia, of course) are of American design and manufacture. In second place is Great Britain, which has produced 15% of the airplanes now in use on the air lines. There are now a total of 1,499 Douglas DC-3's in scheduled air line service throughout the world (404 in the U. S. and 1,095 in the rest of the world). Douglas DC-4's total 301 (158 in U. S. and 143 in the rest of the world).

ONE OF THE important post-war trends developed in air transport design has been the trick of "fuselage stretching." This is the simplest way to produce a transport plane with greater passenger capacity, a job that was accomplished in pre-war years by designing a new and larger airplane. Douglas Aircraft started the trend with their *Super DC-3* by inserting 39" of length in the familiar DC-3 fuselage forward of the wing leading edge. Douglas followed this up by adding 5' to the fuselage of the DC-6 to produce the DC-6A *Liftmaster*. The Glenn L. Martin Company then came up with that same figure of 39" in its extension of the 2-0-2 fuselage to create the new 4-0-4. Latest stretching operation is the addition of no less than 18' to the length of the Lockheed *Constellation* transport, providing capacity for up to 92 passengers. This additional weight and capacity always calls for the addition of more powerful engines to give the same or better performance. But what bothers engineers is the fact that the wing of these airplanes remains just the same (Douglas actually *decreased* the wing area on the *Super DC-3*) with the result that the wing loading has increased substantially in all cases. Increased wing loading, assuming everything else remains the same, means longer take-off, slower rate-of-climb, reduced ceiling and faster landing speeds. The addition of

(*Turn to page 54*)

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REPORT FROM THE WEST

by Jim Saftig

IT SEEMS that around this time of the year the Wakefield Events steal the spotlight in the model field. First we had the eliminations for the six men to go to the finals at Mather Field, Sacramento; the two top men from this meet will represent the West Coast in Finland for the "big meet."

Next on the agenda was the Five-Man Team Event for Wakefield models. This contest took place at the Fontana Airport on May 7; it was conducted by the *Los Angeles Thermal Thumbers* and sponsored by the Aircraft Chapter of the *Engineers and Architects Association of Southern California*. This was the *Thermal Thumbers'* 2nd Annual Wakefield Team Event and was directed by President Bob Dagand. Six five-man teams were present from up and down the coast, and among them was that torrid club that we all know, the *Oakland Cloud Dusters*. You guessed it—they proceeded to pack the winds into their ships, and when they took off, the hardware began to move northward.

Manuel Andrade had a bit of rough luck on his first flight. After his ship had been in the air for a minute and forty-two secs., it splattered itself in some telephone wires. Since the ship was not repairable, Carl Rambo, Joe Bilgri, Jim Cook, and Joe Foster (his team mates) turned on the power to give the other teams a very sound "waxing."

Proxy flier Russ Johnson (for Salisbury), Mom & Pop Robbers, Fudo Takagi, at Wakefield Finals

The thermals were on and off throughout the day, and several five-minute flights were turned in on both test and official attempts. We saw Dell Swartz, of the *San Valeers Club*, in action with his original job, and he should have been a very tired flier when he hit the "sack" the night of the meet. His ship picked up a fat thermal and then set out to get over the San Bernardino mountains. We finally saw him about an hour later well fagged, but he had his ship.

Our good friend Bill Lopez had his tongue hanging out after a couple of beautiful flights that his ship turned in. Wonder whether Bill still likes those parachute dethermalizers.

Ernie Wrisley showed determination to the 'nth degree. Seems Ernie's ship took a power dive on his third attempt and the fuselage went "West." Believe us, all that was left of that fuselage was matchwood. Wrisley got out the old glue bottle and the rest of the repair kit and put his Korda job back in flying condition. What patience!

We had quite a chat with Dick Schumacher at Fontana. Dick was right in there with the Wakefield job he calls *Long Tom*. Your reporter was amazed when Schumacher pulled his radio controlled job out of the rear compartment of his car and held it up for comparison with his Wakefield ship—the rubber job looked larger than the radio plane! We learned from Dick that though the small radio ships are a good deal harder to see when they get out a ways, rough landings do much less damage to them in comparison with the larger jobs. His tiny radio ship is powered with a *Cub .099*, has a 42" span, an R.K. 61 receiver (with *Rudevator*), and weighs in at 42 oz., ready to fly. He calls the plane the *42er*.

Harvey Patten, of San Diego, had one of the most beautiful Wakefields at the meet, and to prove it wasn't built just for looks, he turned in the highest total time of the day. RESULTS: Winning Team — *Oakland Cloud Dusters*. Carl Rambo 12:00; Manuel Andrade 1:42.4; Joe Bilgri 11:43.8; Joe Foster 11:45.3; Jim Cook 11:08.6: Total Time 3 flights.

Dennis Alfred, 7-year-old stunt flier who can fly a pattern with the best

Last-minute results of the finals in the Wakefield Event held at Mather Field, Sacramento May 28th, have just come in via Dick Everett, one of the finalists. Dick tells us that the flying sight was excellent and that the weather in the morning was very nearly perfect for the rubber event. Mom and Pop Robbers took care of the contest direction and the very capable Gordy Peterson was the take-off judge. Hank Cole and contingent arrived from Washington; others came from Medford, Oregon, San Francisco, Oakland, and Southern California.

There were twenty-one hopefuls present to make a try for the "big meet" to be held in Finland this summer. These contestants received instructions just before the contest started and drew numbers for flight positions. The contest started at 9:00 a.m. and ended at 12:30 p.m. At the end of the first round, five men had turned in flights of five minutes and three others had over four minutes. At the end of the second round, only Fudo Takagi of San Diego and Joe Bilgri of Oakland managed to hit the five minute marker but two other contestants had over eight minutes as a result of their first two flights.

In the third round, things got a bit rough; Bilgri turned in less than a minute and Fudo didn't "clock out" much better. Lo Salisbury's ship (proxy-flown by Russ Johnson of San Gabriel, when Lo was taken ill) piled up a bit over three minutes on the third round and managed to slide into first place ahead of Fudo Takagi. It was noted that the fliers from the North seemed to favor long motor runs while the others leaned toward the short power runs.

RESULTS: 1. Lo Salisbury, Los Angeles (Proxy-flown), 691 sec.; 2. Fudo Takagi, San Diego, 685 sec. These two men will represent the West in the finals at Finland.

We would like to thank A. F. Kaifer, Post Office Supervisor, for coming to the rescue of Dick Everett and Fudo Takagi. It seems that Dick and Fudo shipped their models ahead and insured them for quite a bit of money. When the ships arrived, they were taken from the post office and stored in a safer place due to the high insurance value

(*Turn to page* 47)

Dick Schumacher compares his Wakefield ship *Long Tom*, with his 42er baby R.C. job

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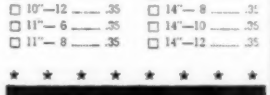

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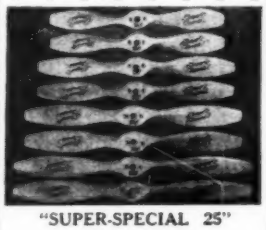
☐ 14"— 6 ..... .35	
☐ 14"— 8 ..... .35	

"RITE-PITCH" CO2 SPECIAL PROPELLERS

Designed especially for Herkimer CO2 Motors. Same general design as "SUPER-STUNTS"

☐ 6"— 4 ..... .35
☐ 7"— 3 ..... .35

★ ★ ★ ★ ★ ★ ★ ★



"SUPER-SPECIAL 25" PROPELLERS

World's lowest-priced quality propellers – Terrific mass production methods make this price and quality possible. Everyone completely finished, hand-sanded, lacquered and balanced.

☐ 8"—6 ..... .25	
☐ 8"—8 ..... .25	
☐ 9"—6 ..... .25	
☐ 9"—8 ..... .25	
☐ 10"—6 ..... .25	
☐ 10"—8 ..... .25	
☐ 11"—6 ..... .25	
☐ 11"—8 ..... .25	

★ ★ ★ ★ ★ ★ ★ ★

NEWEST!!! ROBERTS' LITTLE-PROPELLERS
For the New Little Motors.

☐ Infant ..... .25
☐ Spitfire ..... .25
☐ Cub Fox .049..25
☐ Cub .074..25
☐ Cub .099..25

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"RITE-PITCH" MODEL GAS TANKS

Largest most complete line of ready-to-use tanks in the world !!! All at World's lowest prices.

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☐ No. 1 Small .60 ☐ No. 2 Med. .60
☐ No. 3 Large .60

Vertical Tanks
☐ No. 4 Small .60 ☐ No. 5 Med. .60
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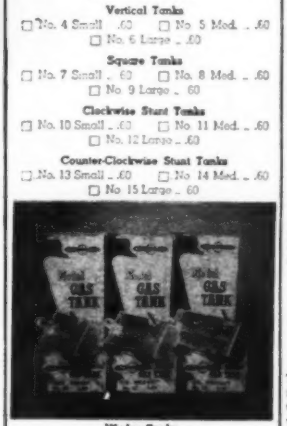
Square Tanks
☐ No. 7 Small .60 ☐ No. 8 Med. .60
☐ No. 9 Large .60

Clockwise Stunt Tanks
☐ No. 10 Small .60 ☐ No. 11 Med. .60
☐ No. 12 Large .60

Counter-Clockwise Stunt Tanks
☐ No. 13 Small .60 ☐ No. 14 Med. .60
☐ No. 15 Large .60



Wedge Tanks
☐ No. 16 Baby .60 ☐ No. 17 Junior .60
☐ No. 18 Senior .60

"Thimble-Spur" Race Car Tank
☐ No. 19 ..... .60

Midget Wedge Tanks for the New Smaller Motors
☐ No. 20 Midget .60 ☐ No. 22 Junior .60
☐ No. 21 Baby .60 ☐ No. 23 Senior .60

★ ★ ★ ★ ★ ★ ★ ★

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ALL-PURPOSE UTILITY CEMENT

FORMULA 22

This new sensation, a companion, of Formula 11 does everything you can ask for when you want a cement that is the strongest in the world, and yet is fast drying. The amazing "Double Action" of Formula 22 makes any job you do easier and stronger. Yours for only 10c a tube.

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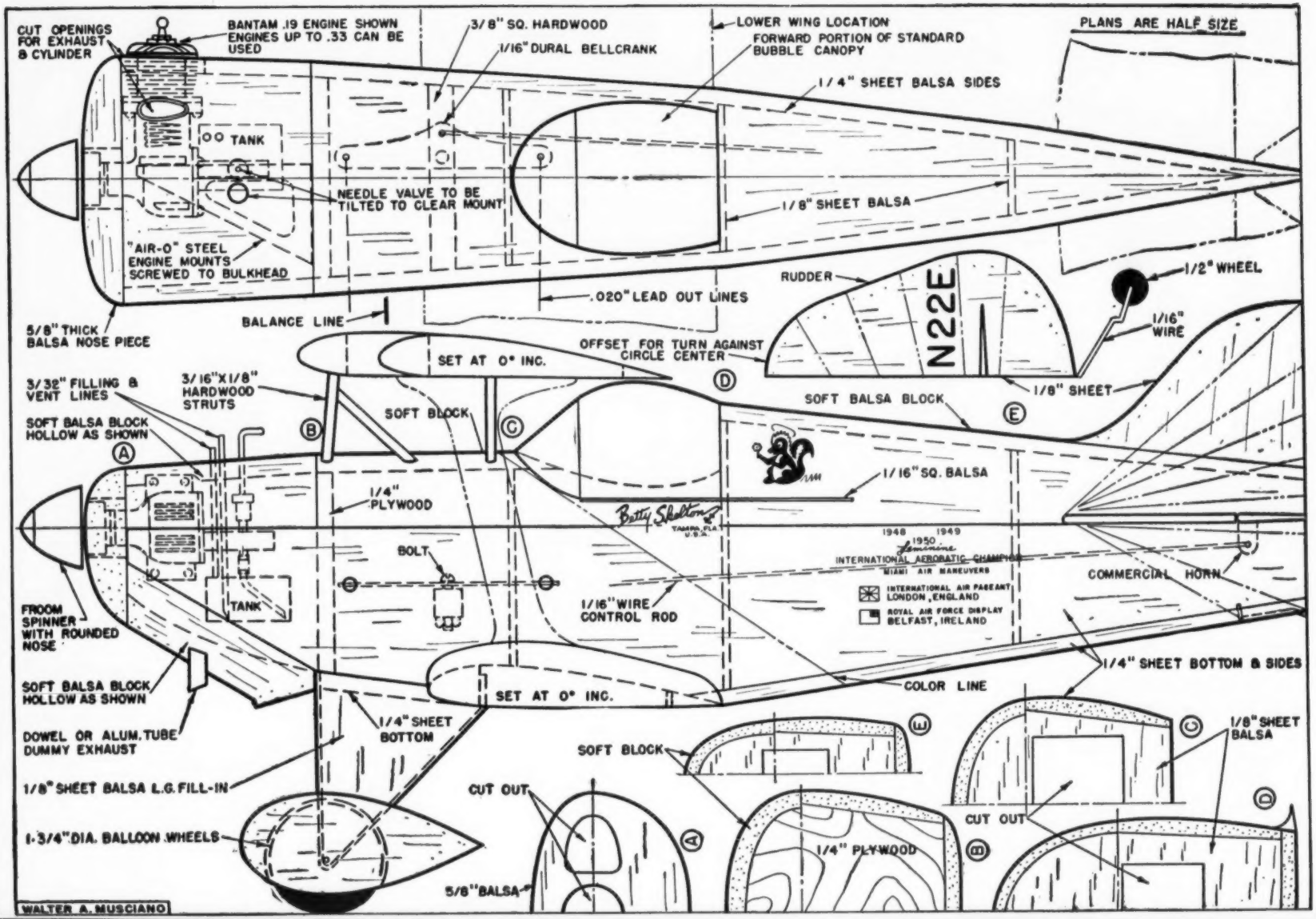
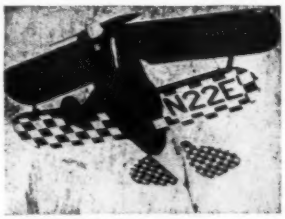
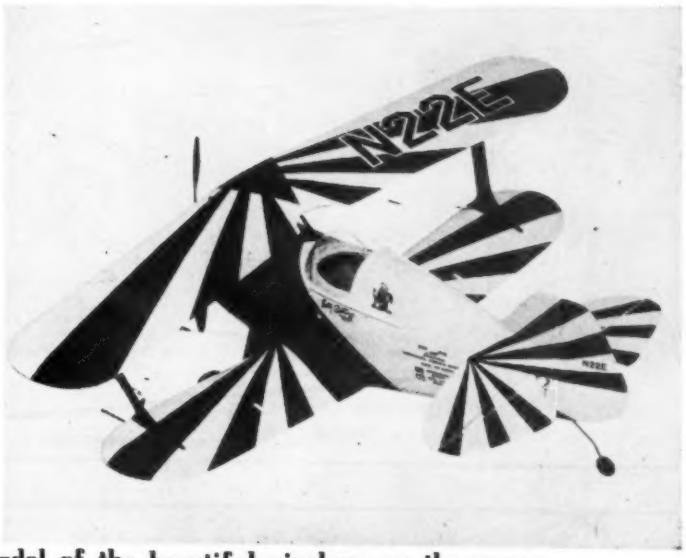

CUT OPENINGS FOR EXHAUST & CYLINDER
BANTAM .19 ENGINE SHOWN ENGINES UP TO .33 CAN BE USED
3/8" SQ. HARDWOOD
1/16" DURAL BELLCRANK
LOWER WING LOCATION
FORWARD PORTION OF STANDARD BUBBLE CANOPY
PLANS ARE HALF SIZE
1/4" SHEET BALSA SIDES
00 TANK
NEEDLE VALVE TO BE TILTED TO CLEAR MOUNT
1/8" SHEET BALSA
"AIR-O" STEEL ENGINE MOUNTS SCREWED TO BULKHEAD
.020" LEAD OUT LINES
RUDDER
1/2" WHEEL
N22E
1/16" WIRE
5/8" THICK BALSA NOSE PIECE
BALANCE LINE
OFFSET FOR TURN AGAINST CIRCLE CENTER
SET AT 0° INC.
3/32" FILLING & VENT LINES
3/16"X1/8" HARDWOOD STRUTS
SOFT BLOCK
SOFT BALSA BLOCK
1/8" SHEET
SOFT BALSA BLOCK HOLLOW AS SHOWN
1/16" SQ. BALSA
1/4" PLYWOOD
Betty Skelton
1948 1949 1950
INTERNATIONAL AEROBATIC CHAMPION
MIAMI AIR MANEUVERS
INTERNATIONAL AIR PAGEANT LONDON, ENGLAND
ROYAL AIR FORCE DISPLAY BELFAST, IRELAND
COMMERCIAL HORN
BOLT
TANK
1/16" WIRE CONTROL ROD
FROOM SPINNER WITH ROUNDED NOSE
1/4" SHEET BOTTOM & SIDES
COLOR LINE
SOFT BALSA BLOCK HOLLOW AS SHOWN
SET AT 0° INC.
DOWEL OR ALUM. TUBE DUMMY EXHAUST
1/4" SHEET BOTTOM
SOFT BLOCK
1/8" SHEET BALSA
1/8" SHEET BALSA L.G. FILL-IN
CUT OUT
CUT OUT
1-3/4" DIA. BALLOON WHEELS
1/4" PLYWOOD
5/8" BALSA
WALTER A. MUSCIANO

MODEL



PITTS SPECIAL



Build your own flying model of the beautiful airplane on the cover.

BETTY SKELTON'S brilliantly decorated tiny aerobatic biplane is one plane that model builders will find hard to pass up. Besides its obvious good looks, our model is easy to build and handles beautifully at the end of 40' lines. The beginner will find construction very elementary while the more advanced modeler will enjoy decorating the model to perfection. This potential Beauty Event winner can accommodate engines from .19 to .33 cu. in. displacement, and although we used a *Bantam .19*, there is plenty of room in this 1-1/2" to the foot scale model for larger engines. The prototype model weighed 17-1/2 oz. ready to fly and was built for sport flying; however, it was evident from the very first flight that the addition of a stunt tank and a symmetrical airfoil would create a super scale stuntster. Now let's get to work on this 190 sq. in. replica of the plane flown by the Feminine International Aerobatic Champion.

Plans are presented one-half size so double all measurements when enlarging them. Perhaps the following construction procedure may seem strange in that we jump from one structure to another and then back again. It has been observed that modelers in general do not wait for the cement to dry, etc., before starting on the next item; therefore we have described the procedure exactly as we built the model. It took 58 hours total to do the job.

Select 1/4" medium soft balsa sheet for the fuselage sides. Trace the side outline onto them and when these are cut out, join them at the rear and install bulkhead "E." Apply cement liberally. While this is drying, cut out the remaining bulkheads from the specified stock as well as the balsa nose piece. Install the bulkheads one at a time using a clamp, if necessary, to hold the fuselage sides to the bulkheads. The nose piece is cemented in place last. Set this assembly aside to dry thoroughly.

Cut out the lower wing ribs and pin directly to the plans, then add the leading and trailing edges. The lower wing is built in two panels and connected by means of two plywood joiners after each panel is complete with soft balsa tips. Install the joiners plus the center section leading and trailing edges. Make certain of the proper dihedral, apply plenty of cement and set aside to dry.

Unlike the lower wing, the upper wing is built in one panel. Splice the leading edge as shown. This is very important and should not be overlooked. Follow the same construction procedure as in the lower wing.

When both wings are dry, the leading and trailing edges and the tips are cut to shape with a very sharp knife or razor plane. Sandpaper the structures smooth and cover with light weight *Silkspan*, or *Sky-Sail*, using a mixture of dope and cement as the adhesive. Do not cover the lower wing center section yet. Cement the lower wing securely to the fuselage.

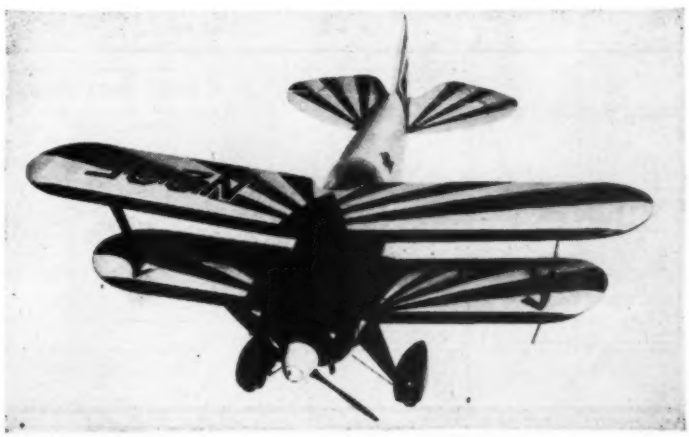
The landing gear is bent entirely from 1/16" music wire. Bind the joints with soft fine wire (not aluminum) and solder well. Notice that the wheel axles are integral with the "V" spreader and that the remainder of the landing gear is bent in one piece. Attach the landing gear to the 1/4" plywood firewall and front lower wing joiner. Use crinoline and plenty of cement. Crinoline is the same material as that used for the backing (which you tear off) on *Band-Aids;* this is cemented to both sides of the bulkhead and joiner, and around the strut. Smear with plenty of cement.

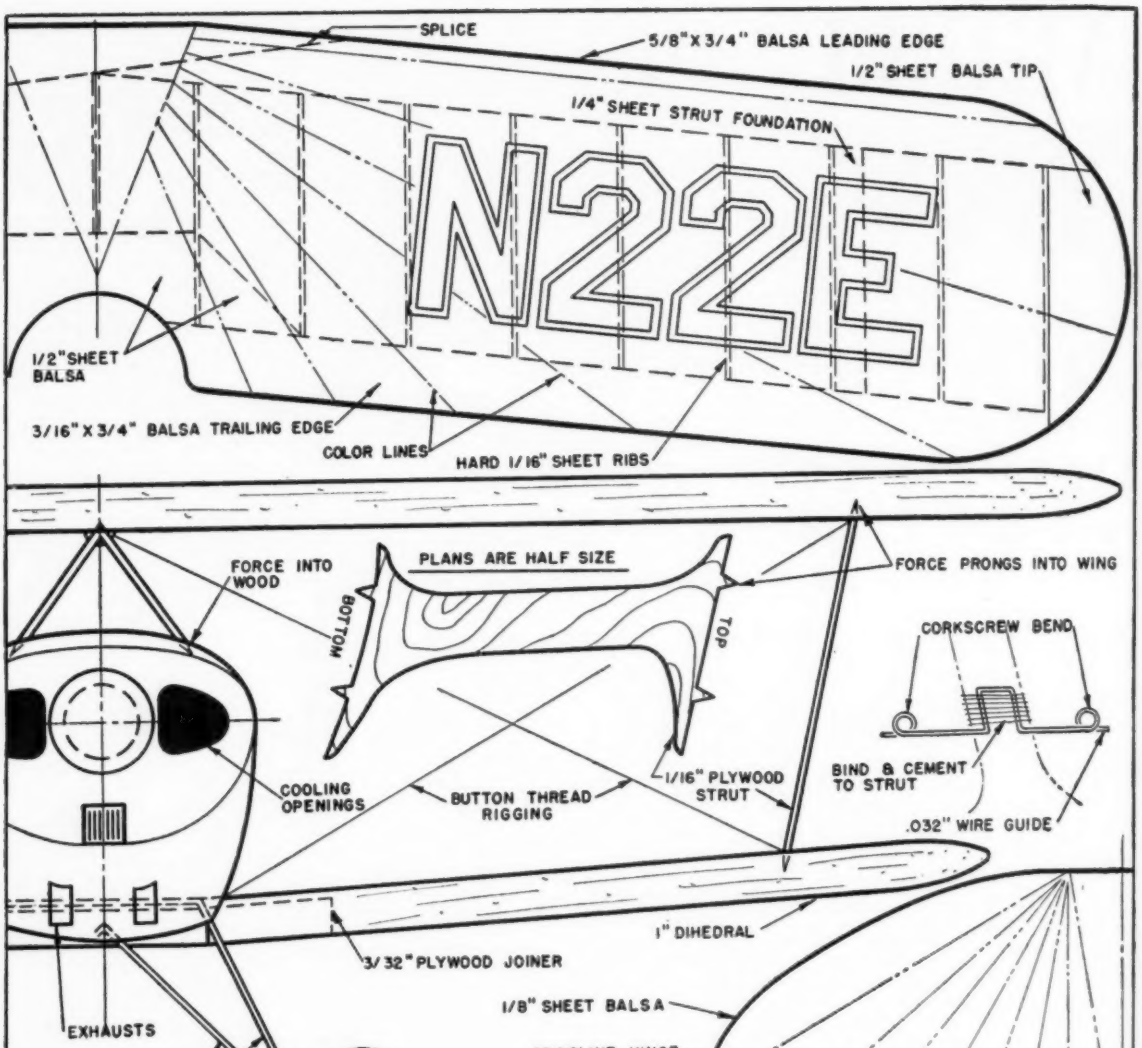
All tail surfaces are cut from 1/8" sheet and sanded to a streamline cross section. Cement the elevator halves to the hardwood spar and install the control horn. Hinge the elevator assembly to the stabilizer and cement the stabilizer to the fuselage top. Cut the hardwood bellcrank support to size and bolt the bellcrank to it. Install the 1/16" wire control rod and cement the bellcrank assembly securely to the fuselage sides. Cover the fuselage bottom with 1/4" sheet and the lower wing center section bottom with *Silkspan*.

Cut the fuselage top and nose blocks roughly to shape and spot-cement in place. Using a very sharp knife (we use an *Xacto* No. 26 blade) cut the blocks to shape, as well as the fuselage sides, following the cross sections shown. Sand smooth and apply one coat of Testor's *Sanding Sealer*. Carefully remove these blocks and hollow with a gouge as the plans indicate. Now cement the blocks permanently in place and sand the entire fuselage. Apply two more coats of *Sealer* and sand smooth.

(*Turn to page* 35)

by WALTER MUSCIANO




SPLICE
5/8"X3/4" BALSA LEADING EDGE
1/2" SHEET BALSA TIP
1/4" SHEET STRUT FOUNDATION
N22E
1/2" SHEET BALSA
3/16"X3/4" BALSA TRAILING EDGE
COLOR LINES
HARD 1/16" SHEET RIBS
FORCE INTO WOOD
PLANS ARE HALF SIZE
BOTTOM
TOP
FORCE PRONGS INTO WING
CORKSCREW BEND
BIND & CEMENT TO STRUT
.032" WIRE GUIDE
COOLING OPENINGS
BUTTON THREAD RIGGING
1/16" PLYWOOD STRUT
1" DIHEDRAL
3/32" PLYWOOD JOINER
EXHAUSTS
1/8" SHEET BALSA
CRINOLINE HINGE
1/16" WIRE STRUTS
1/4" SHEET SANDWICHED TOGETHER
BIND WITH FINE WIRE & SOLDER WELL
1/8"X1/4" HARDWOOD ELEVATOR SPAR
DIHEDRAL BREAK
5/8"X3/4" LEADING EDGE
1/4" SHEET BALSA STRUT FOUNDATION
COLOR LINES
1/2" SHEET BALSA TIP
3/32" PLYWOOD JOINERS
1/8" SQ. BALSA
1/16" HARD SHEET BALSA RIBS
3/16"X3/4" T.E.
AILERON OUTLINE
WALTER A. MUSCIANO

Strictly Solid

by FREDERIC K. HOWARD

THAT long-time favorite of beginners—the solid model—is probably the most common of all scale types. Manufacturers provide a variety of kits, model magazines feature plans and pictures, and hobby stores display by the score brilliantly painted examples of this kind of miniature. Yet with all the quantity production, it is unusual to find a really good solid model—the bulk of the output simply lacks authenticity. In fact, in some cases, any resemblance between the model and the airplane appears almost coincidental. The unconvincing appearance of solid scales is more or less taken for granted, the type being commonly regarded as suitable only for inexperienced builders—or at best, judged inherently unrealistic. The scarcity of accurate, carefully built solid models is in part due to this attitude—one which assumes the type to be necessarily a simplified scale approximation (a suggestion, say, of the general arrangement) of the actual airplane, with little need for the builder to become concerned over detail, precise workmanship, or finish. However, it is exactly on these points—accuracy, detail and finish—that any scale model, regardless of size and irrespective of the materials used, gains or loses in realism.

The faults of any scale model can be listed as inaccuracies, defective finish, or inadequate detail and the usual, small scale model with a span of 6 to 12" or so is unfortunately often guilty on all counts. The most apparent errors in scale are in the smaller dimensions—for example, in the thicknesses of surfaces or the size and location of struts and other small parts. A fact worth remembering is that solid models, customarily being built to scale of 1/4 to 1/2" to 1', are more sensitive with respect to scale inaccuracy than are the larger built-up (so-called, detailed) models. That is, an error in scale on a small model can be obvious where the same error on a model to a larger scale might escape notice.

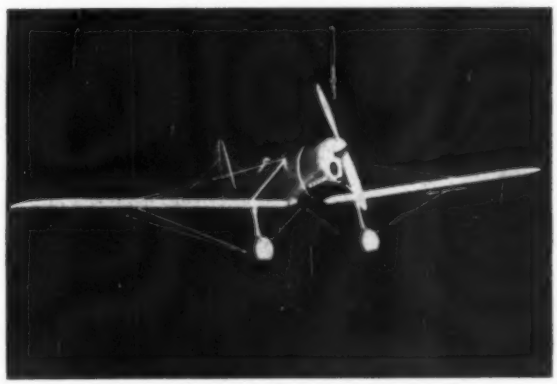
Although scale accuracy is important, solid models undoubtedly suffer more from careless treatment of detail and finish than from inaccuracies. In this matter the solid model is at a definite disadvantage since balsa itself bears no resemblance to the fabric, metal, or plastic external surfaces of airplanes. Over-all scale accuracy cannot alone make a solid balsa wing convincingly resemble a fabric covered full size wing or a model wood prop resemble the real steel propeller. Something more is required. Every hobby house displays solid scale *T-Crafts*, *Cubs*, or *Aeroncas*, which unfortunately resemble blocks of balsa, painted, far more than they resemble the full size airplane. Realism clearly depends as much upon disguising the materials from which the model is built as upon scale accuracy. Disguising the materials—usually balsa—means, in the case of a model of a fabric covered airplane, finding some technique by means of which the solid balsa can be made to resemble a fabric cover.

A good many years ago solid scale models often featured thread doped chordwise at regular intervals throughout the wingspan to suggest a fabric cover over a rib and spar structure. This was an effective technique, particularly for such aircraft as the Boeing P-12 or the old Curtiss *Hawk* in which the heavy taping over the ribs produced much the same effect as the thread on the miniatures. The chief characteristic of most fabric-covered wings, however, is the slight sag of the fabric between the ribs, and the best and easiest way to duplicate this effect is simply to sand it into the completed solid wing (being careful not to overdo it) using sandpaper wrapped

(*Turn to page* 46)

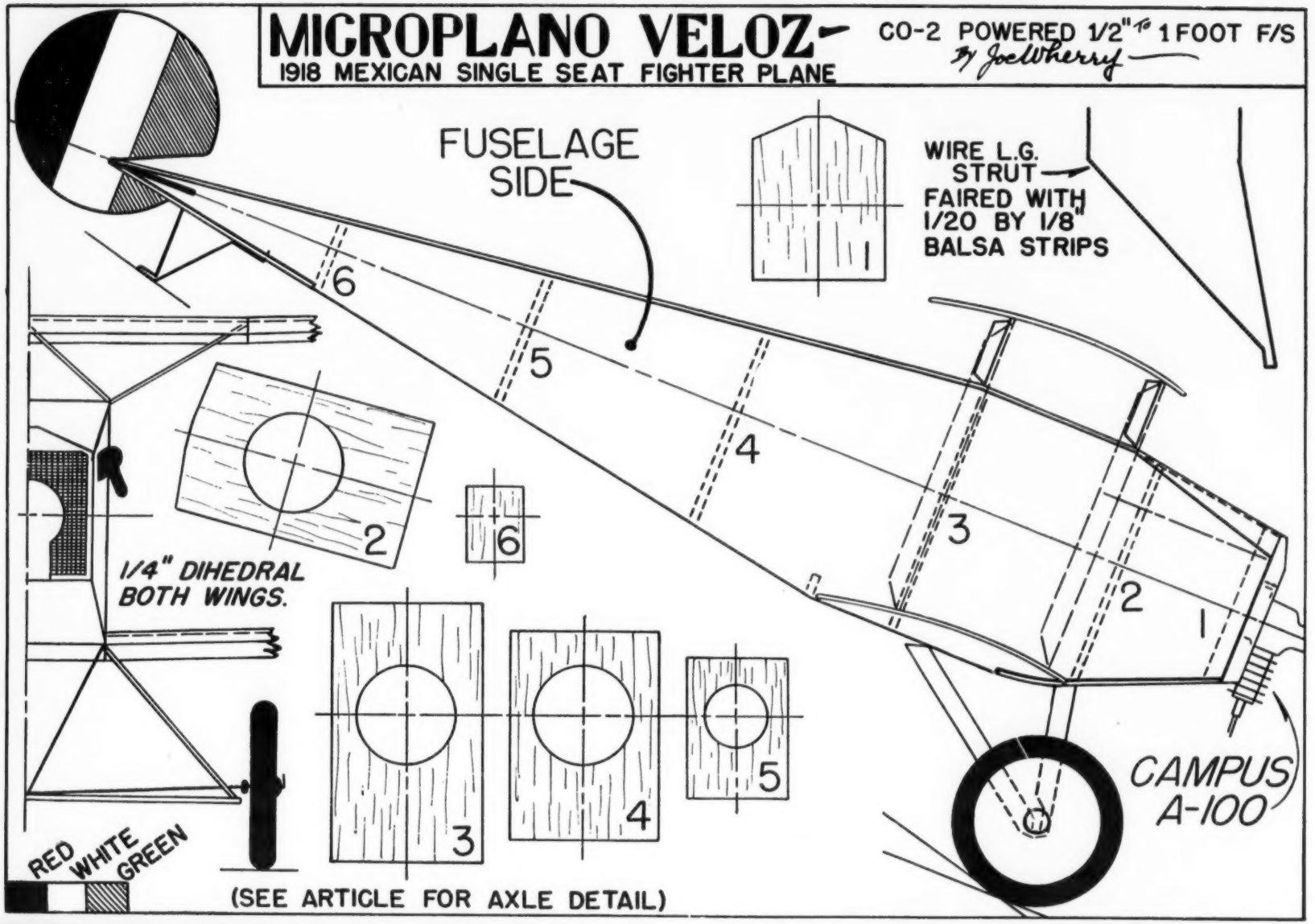
This realistic Ryan model, though small, has the essential scale details

Pitcairn biplane offers chance for interesting detail on the tiny engine



Bracing "wires" of the Ryan model show up well

Of less than one-foot span, this model has full control system


MICROPLANO VELOZ
1918 MEXICAN SINGLE SEAT FIGHTER PLANE
CO-2 POWERED 1/2" TO 1 FOOT F/S
By Joe Wherry
FUSELAGE SIDE
WIRE L.G. STRUT FAIRED WITH 1/20 BY 1/8" BALSA STRIPS
1/4" DIHEDRAL BOTH WINGS.
RED WHITE GREEN
(SEE ARTICLE FOR AXLE DETAIL)
CAMPUS A-100

MEXICAN VELOZ

by JOSEPH H. WHERRY

THE last two years of World War I found the Allies and the Central Powers feverishly building warplanes at a pace that would have been scoffed at as visionary only a few short years earlier. Neutral nations, too, were beginning to assemble military air forces; Norway was experimenting with plywood monocoque construction, Spain was holding military maneuvers complete with supporting aircraft. Even little Siam had a few military pilots (some even served in obscure fashion with the Allies). Latin American nations were seeing in the "aeroplane" a new means of warfare. Indeed, before the 1914-18 war, a revolutionary pilot had pulled off a one-plane bombing raid, and the plane he flew was an American-built craft—but that's another story.

The above does serve as background, however, for the flying scale model we are featuring herewith. Yes, Mexico, too, was building the nucleus of an air force. It was in February, 1918, that a trim single-seater biplane rolled from the government-owned Military Aviation Factory. Somewhat resembling early Fokker designs, namely the D.I and D.II, this aircraft, the *Microplano Veloz*, was fitted with a 150 hp Hispano-Suiza engine. The pioneering designers were Senor Santarini and Captain Villasana. The latter was Chief of the Technical Department of the M.A.F. and an officer of the Mexican Army. The ship developed a ground level speed of around 120 mph.

The *Microplano Veloz* caught the writer's eye for several reasons: first, it's an obscure type and he was bored with too many models of well-known planes; secondly, authentic records credit it with being an extremely able aircraft (probably the equal of most, and the superior of some U. S. designs of that period); and lastly, this plane materialized in CO2 powered flying scale form because its proportions make it a natural for realistic flights. Take it from an old-timer, there's nothing quite like a scale model of a biplane for realism. Try this model and be convinced. Construction is very simple, the only unusual feature being the staggered position of the interplane struts.

The principal material required is a generous supply of even grained, medium weight 1/20" sheet balsa, a small amount of 1/16" sheet balsa, and the usual scraps found on any modeler's work table.

First make templates of the fuselage side, top left and bottom left wing panels (these, of course, can be used for right side also), center section, and the bulkheads. Cut two of bulkhead No. 1 from 1/8" sheet balsa. Cut the opening shown in front view from one layer only to accommodate the *Campus* CO2 engine. Remaining bulkheads are cut from 1/16" sheet balsa. Cement bulkheads 2, 3, and 4 between fuselage sides (the latter may be marked lightly with lead pencil so that bulkheads may be accurately inserted). Take care to have sides accurately aligned. Next, cement nose bulkhead in place, and when dry cement remaining bulkheads in place. Note that the rear of fuselage culminates in a sharp point with no rudder post or other common constructional feature.

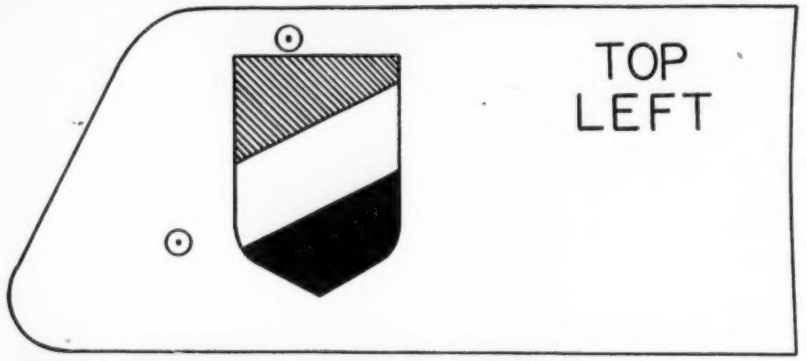
The fuselage may just as well be completed at this time, by inserting the 1/16" x 1/4" crosspiece seen just at trailing edge of bottom wing in the side view, and by covering the top with 1/20" sheet (grain running from side to side). Cover fuselage bottom with sheeting also, to the point indicated on the side view. The nose (or No. 1) bulkhead may now be lightly carved and sanded to conform with side view, and the cylinder banks and exhaust assemblies may be added to each side. (The writer found it more simple and quicker to assemble each exhaust unit separately and to dope them black before cementing in place.) You may even sand the entire fuselage at this time; then apply two coats of plasticized clear dope, finishing off with several coats of aluminum dope from bulkhead No. 2 foreward as shown in the accompanying photograph.

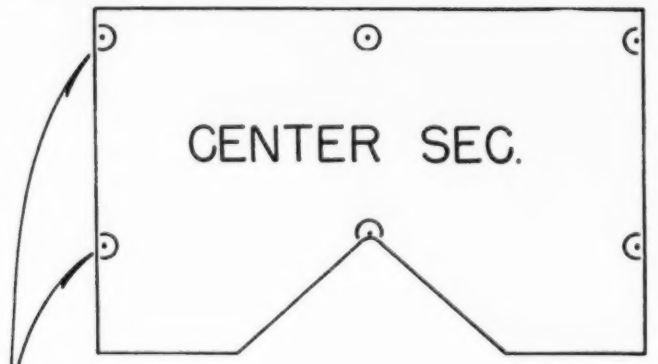
Drill small holes (see top view) to receive the center section struts which are made (both of them) by bending a single piece of .010 steel wire. Streamline these struts with 1/8" wide strips of 1/20" sheet balsa. Cement the struts in place, checking side view carefully.

Now bend two landing gear struts as shown from .020 steel wire. These, too, are faired with balsa, streamlined and cemented in place to the inside of fuselage sides with due reference to drawing front and side views. Complete fuselage, if you have not already done so, by covering the bottom of same aft of bulkhead No. 6 with sheet balsa, and the remainder with white tissue or *Silkspan*. Water-spray the latter; then give two coats of clear dope.

(*Turn to page* 50)

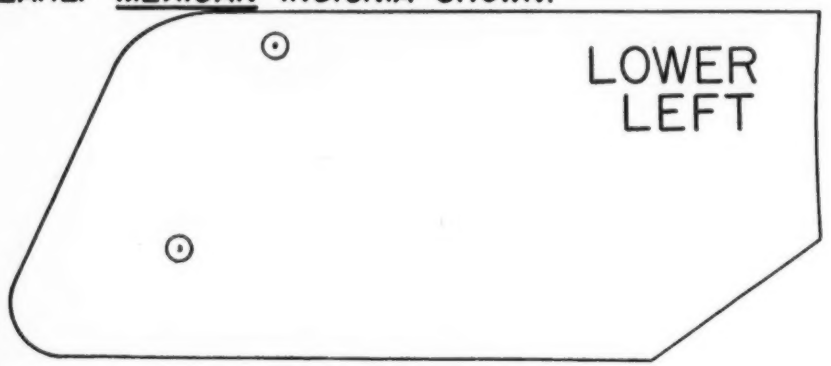
WINGS, FUS. SIDES, & EMPENAGE ARE OF 1/20" SHEET BALSA. WIRE PARTS .020" STEEL WIRE.

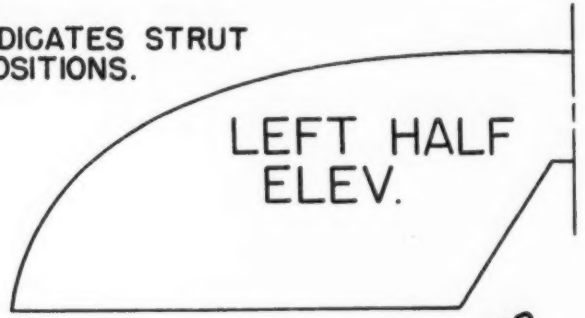


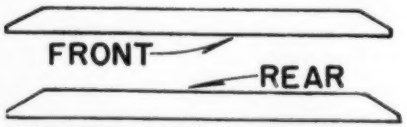


EARLY MEXICAN INSIGNIA SHOWN.

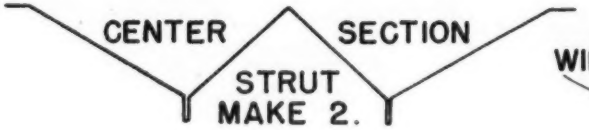
INDICATES STRUT POSITIONS.

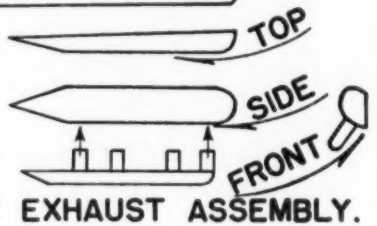






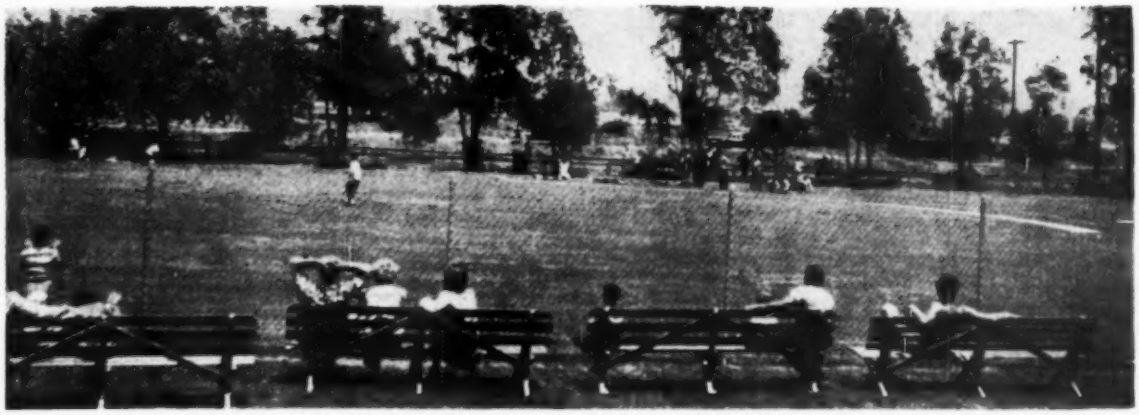
INTERPLANE STRUTS.





EXHAUST ASSEMBLY.

"Microplano Valog" JHW.



One of the controline flying circles. Benches are provided for spectators who sit behind heavy fence

Public Recreation Areas

How one large city operates in closest cooperation with model builders

by CARL L. HELSEL

AS AN outgrowth of the recreation movement in this country, there is coming a realization of the public's responsibility to provide facilities and leadership for satisfaction of the desires of model builders and hobbyists.

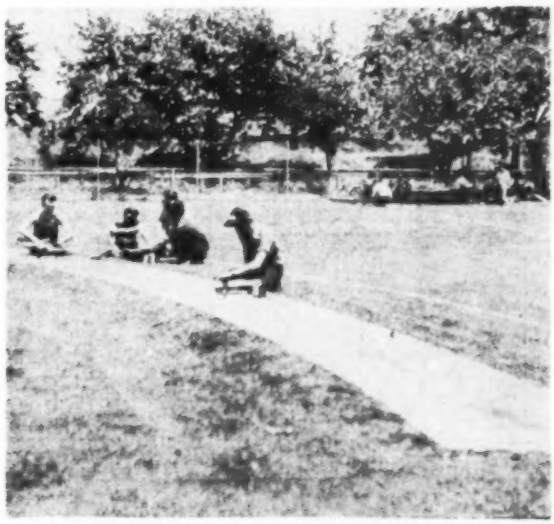
The City of Los Angeles has made a step in this direction through the program being initiated by the Recreation and Parks Department.

The Recreation Department, headed by its General Manager, George Hjelte, is carrying on a progressive program of activities for the model builder. Over a year and a half ago this Department, realizing the urgent need for facilities for model aircraft and model race cars, brought together representatives from the various fields of modeling to assist the Recreation Department in setting up this program. These representatives included such nationally known modelers as Dick Schumacher —Wakefield team member, Frank Cummings—Nationals winner, Bill Butler, Louis Nordlinger, Frank Barbaro, Norman Murray, Louis Borelli, Andy Peterson, and Frank Purpull. These representatives are lay people in the community having no commercial connections with the hobby industry. The group adopted as its name *The Los Angeles Model Hobby Advisory Committee.*

The general function of this Committee is to advise the Recreation and Parks Department as to needs for the establishment of facilities for modelers in the area. At the time of organization of the Committee the two most urgent needs of the modelers were areas for controline flying and a suitable race car track. The Committee subsequently provided recommendations for controline areas and design of such areas as well as the design of the race car track.

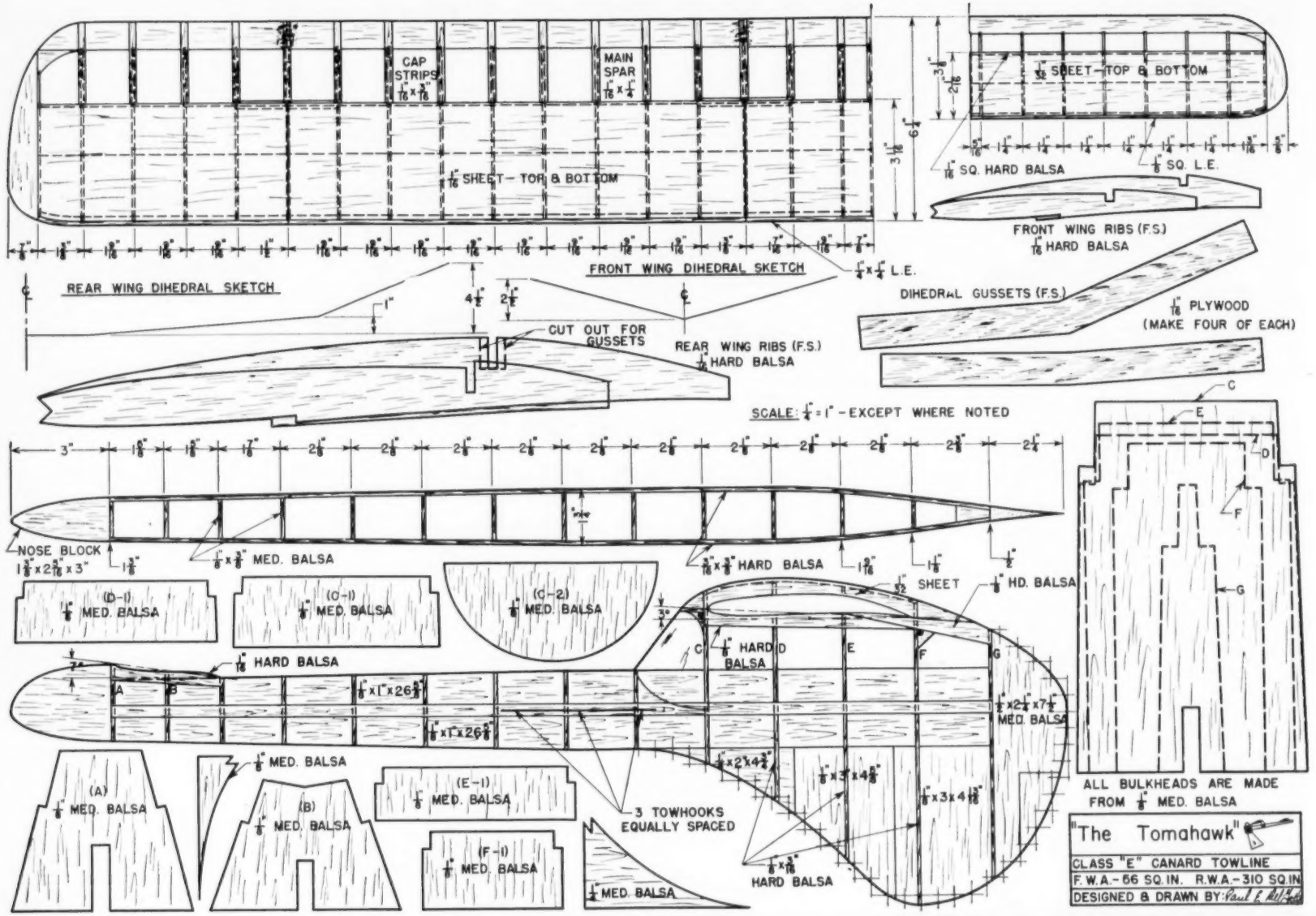
In the consideration of controline sites, noise was the predominating factor as it is in any populated area. The Physics Department of the University of California at Los Angeles was asked to assist with experiments in noise control. Mr. William Frederickson, Jr., Superintendent of Recreation, in cooperation with Professor Del Sasso of the University, conducted the experiments which indicated that the use of mufflers in

(*Turn to page* 52)



Circles are grass covered, with 90° concrete runways

Ron Jantze, Joe Gryalva, Butch Williams check cars on rail track


CAP STRIPS 1/16" x 3/16"
MAIN SPAR 1/16" x 1/4"
1/16" SHEET - TOP & BOTTOM
1/32" SHEET - TOP & BOTTOM
1/16" SQ. HARD BALSA
1/8" SQ. L.E.
1/4" x 1/4" L.E.
FRONT WING RIBS (F.S.) 1/16" HARD BALSA
FRONT WING DIHEDRAL SKETCH
REAR WING DIHEDRAL SKETCH
CUT OUT FOR GUSSETS
REAR WING RIBS (F.S.) 1/16" HARD BALSA
DIHEDRAL GUSSETS (F.S.)
1/16" PLYWOOD (MAKE FOUR OF EACH)
SCALE: 1/4" = 1" - EXCEPT WHERE NOTED
NOSE BLOCK 1 3/8" x 2 7/16" x 3"
1/8" x 3/8" MED. BALSA
3/16" x 3/8" HARD BALSA
1/32" SHEET
1/8" HD. BALSA
(D-1) 1/8" MED. BALSA
(C-1) 1/8" MED. BALSA
(C-2) 1/8" MED. BALSA
1/16" HARD BALSA
1/4" HARD BALSA
1/8" x 1" x 26 1/2"
1/8" x 1" x 26 3/8"
1/4" x 2 1/4" x 7 1/2" MED. BALSA
1/4" x 2" x 4 1/2"
1/8" x 3" x 4 5/8"
1/8" x 3" x 4 11/16"
3 TOWHOOKS EQUALLY SPACED
1/16" x 3/8" HARD BALSA
1/4" MED. BALSA
(A) 1/8" MED. BALSA
1/8" MED. BALSA
(B) 1/8" MED. BALSA
(E-1) 1/8" MED. BALSA
(F-1) 1/8" MED. BALSA
ALL BULKHEADS ARE MADE FROM 1/8" MED. BALSA
"The Tomahawk"
CLASS "E" CANARD TOWLINE
F.W.A. - 56 SQ. IN. R.W.A. - 310 SQ. IN.
DESIGNED & DRAWN BY: Paul K. Mc Ilhenny

TOMAHAWK

by PAUL E. DEL GATTO

A WAY back in the early 'thirties there appeared on the model-building scene several highly successful tractors, which were quite similar to our present tractor designs. Until this time, nearly all models had been of a canard configuration. Because of the success of the tractor designs and the pleasing lines compared to canards of that era, it was only a short while before they began to dominate the model-building scene. Of course, there were many old-timers aware of the merits of a canard configuration, but as they kept dropping out of the picture, so did canards. Today if a model builder so much as suggests building a canard, he is suspected of having a few loose screws. This is primarily due to the fact that the majority of present-day model builders have taken up the hobby after the canard recession. Therefore, not being aware of its merits or not having the time to evolve successful designs through experimentation, the average builder is drawn towards more conventional designs.

To infer that canards are superior to the conventional tractors would be erroneous. It would be more exact to say there are times when the advantages of a canard configuration weigh heavily in its favor, overshadowing its disadvantages and also the advantages of conventional designs.

The canard configuration in the present case was chosen mainly to accommodate an unusual airfoil. As you will note from the drawing, the airfoil appears radically different from the types generally used on model aircraft. The airfoil is the LDC-2—a laminar-flow section developed by the *Low Speed Aerodynamics Research Association (L.S.A.R.A.)*, in England several years ago. The results obtained with the airfoil were considered astounding when compared with such popular airfoils as the Clark Y and the R.A.F. 32. However there are several drawbacks, which make it necessary to take certain precautions in order to obtain peak results.

Many of us are aware that the wake from an ordinary turbulent flow wing section is wide and diffuse, and although the tailplane on a conventional design is almost always within it, the resultant loss in tailplane efficiency is usually not more than 20%. However, in the case of the laminar flow LDC-2, the wake is very thin and concentrated. For this reason, it is imperative that the tail surface be mounted high enough to clear the upper camber of the wing surface. If not, the resultant tailplane efficiency may be as low as 50%. While this may more often than not constitute a major problem in a conventional design, the canard configuration presented herein lends itself quite readily to such an arrangement.

In view of the fact that the LDC-2 is not as stable as many of the popular airfoils, it is of prime importance to use that type of configuration from which longitudinal stability can most easily be obtained. The type which is best suited is the canard.

Many hours were spent working on the design to achieve a balance between ruggedness and streamlining. Both of the objectives were reached to a high degree. Although enough balsa was used to stock a hobby shop, the model weighed in at less than 8 oz. For flying in competition, this constitutes a minor problem since little or no ballast will be required to balance the model. In fact, the original model used no ballast whatsoever. Trim adjustments were made with a tab on the right panel of the rear wing, and with the rudder tab shown on the plans.

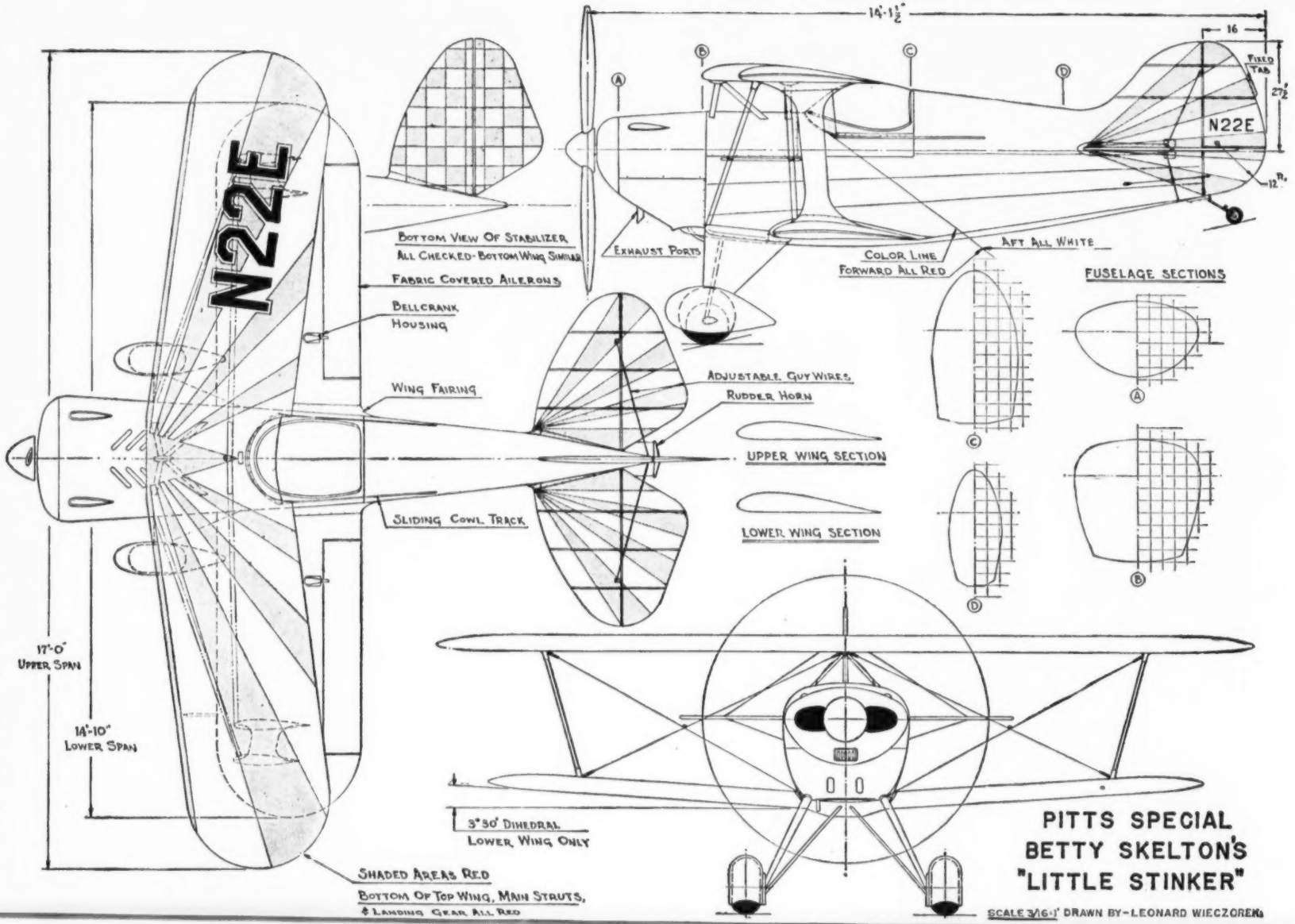
Right now many of you are probably wondering how the model reacts on a towline. Since good towing is dependent on models stability, towing the *Tomahawk* is no more trouble than if you were towing a conventional model.

If you are looking for something new that is a sure fire threat in competition, you can't go wrong with the *Tomahawk*. So, why not scale up the plans and take a crack at it. All bulkheads, ribs and formers are shown full size, thus eliminating the greatest portion of the preliminary work.

Fuselage. With the aid of pins, place the longerons for the crutch on the plans. Then fasten the crossbraces in position. Allow ample time for drying, otherwise the rear end may spring apart or get out of alignment. While the crutch is drying, the bulkheads can be cut out. The two 1/8" sheets of balsa which run the complete length of the crutch should also be cut to shape.

Notch the top sheet to receive the bulkheads. Such a joint insures correct alignment, and also increases the strength and rigidity of the joint. Cement the sheets in place and allow them to dry for a while. Then add the additional sheeting at the rear of the fuselage. Cement the bulkheads and diagonals in position. Be certain that they are aligned properly,

(*Turn to page* 36)


N22E
14'-1½"
16
FIXED TAB
27½"
12"
BOTTOM VIEW OF STABILIZER
ALL CHECKED-BOTTOM WING SIMILAR
FABRIC COVERED AILERONS
BELLCRANK HOUSING
WING FAIRING
SLIDING COWL TRACK
EXHAUST PORTS
COLOR LINE
FORWARD ALL RED
AFT ALL WHITE
ADJUSTABLE GUY WIRES
RUDDER HORN
UPPER WING SECTION
LOWER WING SECTION
FUSELAGE SECTIONS
17'-0" UPPER SPAN
14'-10" LOWER SPAN
3°30' DIHEDRAL
LOWER WING ONLY
SHADED AREAS RED
BOTTOM OF TOP WING, MAIN STRUTS,
& LANDING GEAR ALL RED
PITTS SPECIAL
BETTY SKELTON'S
"LITTLE STINKER"
SCALE 3/16"-1' DRAWN BY-LEONARD WIECZOREK

SCALE 3/8" DRAWN BY-LEONARD WIECZOREK

BOTTOM OR TOP WING, MAIN STRUTS, & LANDING GEAR, ALL RED

Aerobatic Champ Betty Skelton, with her *Little Stinker*. This view and that on cover show the airplane with its latest paint job

The Little Stinker

By ROBERT McLARREN

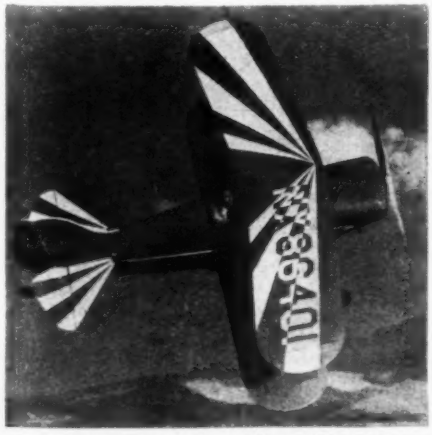
SINCE this series began more than a dozen years ago, we have confined our monthly discussions to the feature airplane of the issue. But this month, our feature airplane must share the limelight with its pilot, for Betty Skelton is inseparable from any discussion of *Little Stinker*, our Plane of the Month. It is impossible to talk about one without talking about the other, and together they have created international fame for each member of the team.

Obviously, Betty came first in the scheme of things and we'll give her the spotlight until the proper point in time when her white sunburst-crimson stunt plane enters the picture. Betty June Skelton was born June 28, 1926, and that makes her a mere 24 years old as you read this, yet she has twice been Women's International Acrobatic Champion (and many say three times, since she was entered against men in the 1950 Championships). Betty's fame and piloting skill are not the products of a high-pressure promotion campaign but stem from a genuine and long-felt devotion to flying.

At the tender age of 12, a grade-school student in Pensacola, Florida, she wrote off for some pamphlets on aviation, and when they arrived, she devoured them. An interested spectator to Betty's flying interest was her father, David L. Skelton, who had been a railroad conductor for 17 years, but suddenly renounced his career to take up flying. He gained experience rapidly and became a licensed flight instructor. Whenever Pa Skelton went aloft, little Betty was right by his side, eagerly handling the controls. When Betty was 14, her dad moved the family to Tampa, Florida, and there he started the Airco Aviation Corporation.

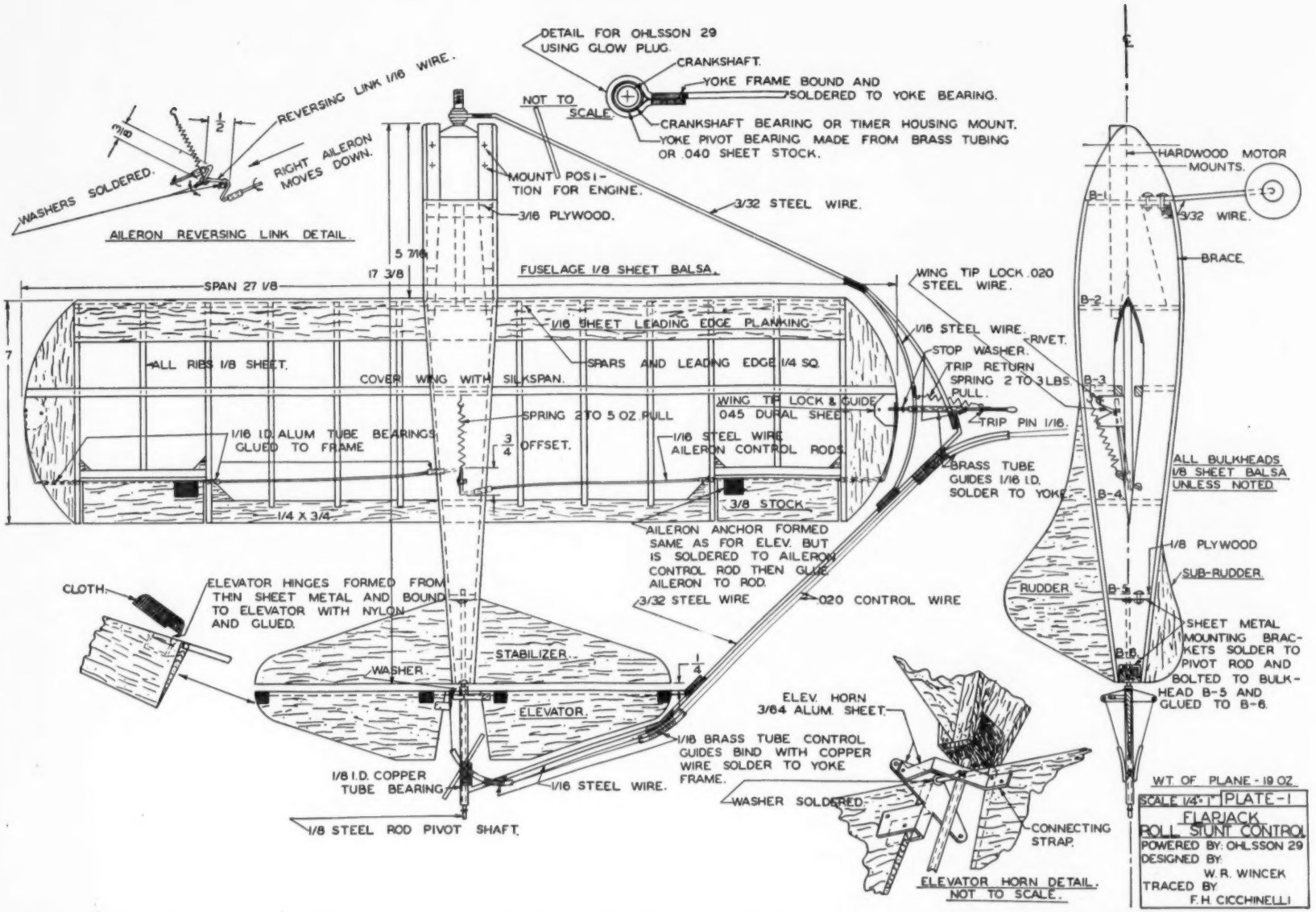
Betty finally obtained her commercial license (she had been flying for years) while still a student in high school. After graduation she went to work for Eastern Air Lines, working nights as a passenger service representative; at the age of 18 she was the owner of an instructor's rating and began appearing at air shows. When she learned that there would be an acrobatics event in an air show at Tampa sponsored by the National Aeronautics Association, she appealed to famed Clem Whittenbeck, then International Acrobatics Champion, to rush her through acrobatic instruction as quickly as possible since there wasn't much time. She mastered the master's course and flew through the show with skill and showmanship. Harvey Thornton asked her to appear in an air show at Lake Wales, Florida, and veteran air show director Steadham Acker invited her to fly in his air show at Reading, Pa., in 1946. After these appearances, Betty's life became an almost daily battle with air show sched-

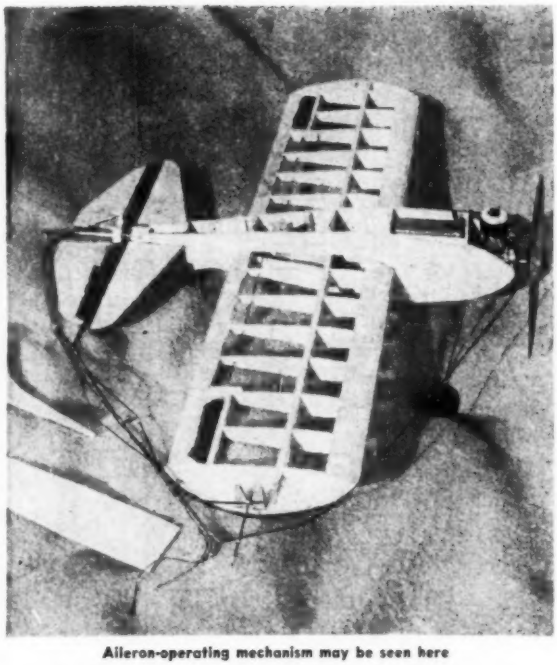
(*Turn to page* 49)



The *Pitts Special*, before addition of pants, etc.

Curtis Pitts, designer and builder, poses with his very attractive and successful *Special*


DETAIL FOR OHLSSON 29 USING GLOW PLUG.
CRANKSHAFT.
YOKE FRAME BOUND AND SOLDERED TO YOKE BEARING.
NOT TO SCALE.
CRANKSHAFT BEARING OR TIMER HOUSING MOUNT.
YOKE PIVOT BEARING MADE FROM BRASS TUBING OR .040 SHEET STOCK.
REVERSING LINK 1/16 WIRE.
RIGHT AILERON MOVES DOWN.
WASHERS SOLDERED.
AILERON REVERSING LINK DETAIL.
MOUNT POSITION FOR ENGINE.
3/16 PLYWOOD.
3/32 STEEL WIRE.
5 7/16
17 3/8
FUSELAGE 1/8 SHEET BALSA.
SPAN 27 1/8
WING TIP LOCK .020 STEEL WIRE.
1/16 SHEET LEADING EDGE PLANKING.
1/16 STEEL WIRE.
RIVET.
STOP WASHER.
TRIP RETURN SPRING 2 TO 3 LBS. PULL.
ALL RIBS 1/8 SHEET.
COVER WING WITH SILKSPAN.
SPARS AND LEADING EDGE 1/4 SQ.
WING TIP LOCK & GUIDE .045 DURAL SHEET
TRIP PIN 1/16.
SPRING 2 TO 5 OZ PULL
1/16 I.D. ALUM TUBE BEARINGS GLUED TO FRAME
3/4 OFFSET.
1/16 STEEL WIRE AILERON CONTROL RODS.
BRASS TUBE GUIDES 1/16 I.D. SOLDER TO YOKE.
3/8 STOCK.
1/4 X 3/4
AILERON ANCHOR FORMED SAME AS FOR ELEV. BUT IS SOLDERED TO AILERON CONTROL ROD THEN GLUE AILERON TO ROD.
3/32 STEEL WIRE
.020 CONTROL WIRE
CLOTH.
ELEVATOR HINGES FORMED FROM THIN SHEET METAL AND BOUND TO ELEVATOR WITH NYLON AND GLUED.
STABILIZER.
WASHER.
1/4
ELEVATOR.
1/8 I.D. COPPER TUBE BEARING.
1/16 STEEL WIRE.
1/8 STEEL ROD PIVOT SHAFT.
1/16 BRASS TUBE CONTROL GUIDES BIND WITH COPPER WIRE SOLDER TO YOKE FRAME.
ELEV. HORN 3/64 ALUM. SHEET.
WASHER SOLDERED.
CONNECTING STRAP.
ELEVATOR HORN DETAIL. NOT TO SCALE.
HARDWOOD MOTOR MOUNTS.
B-1
3/32 WIRE.
BRACE.
B-2
B-3
B-4
B-5
B-6
ALL BULKHEADS 1/8 SHEET BALSA UNLESS NOTED
1/8 PLYWOOD
SUB-RUDDER.
RUDDER.
SHEET METAL MOUNTING BRACKETS SOLDER TO PIVOT ROD AND BOLTED TO BULKHEAD B-5 AND GLUED TO B-6.
WT OF PLANE - 19 OZ.
SCALE 1/4" = 1" PLATE - 1
FLAPJACK
ROLL STUNT CONTROL
POWERED BY: OHLSSON 29
DESIGNED BY: W. R. WINCEK
TRACED BY: F. H. CICCHINELLI



Aileron-operating mechanism may be seen here

The author with one of his early roll ships

FLAPJACK

by WALTER R. WINCEK

THE lid's off, fellows! Here is the result of four years of roll stunt control experimenting and it's all yours. You can be sure there had been much midnight oil burned developing this controline model. Many control configurations were tested before this model was completed, and, of course, many crack-ups were experienced before arriving at the present design.

Simplicity of design was the key factor we sought. At best, models require enough time to build, let alone involving a complicated roll system. You will agree after looking the plan details over, that this model offers no harder a construction procedure than the average stunt model, plus some extra soldering and wire bending.

Flapjack has been flown at several local meets, and demonstration flights were made at the Nationals in Olathe. The high winds prevented me from flying it more there. Since I have worked off and on with this roll idea for the past four years until now, I can honestly say a model airplane can do successful roll stunts without any special skill on the flier's part.

The roll actuating mechanism was kept to a minimum of detail. The materials are very easily obtained and of easy constructional nature, requiring only the common model builders tools and soldering iron.

The plane is of the simple and commonly-used stunt model type, utilizing a box-type fuselage. The sides are identical, as are the top and bottom, bulkheads being rectangular.

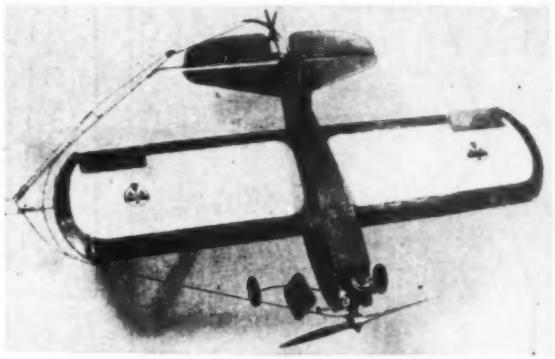
The wing is built up and covered with silk or heavy model tissue. Rudder and elevator are of 1/4" medium sheet balsa.

The motor mount position and front pivot bearing may be altered for a different kind of motor, if necessary. An *Ohlsson and Rice 29* was used because of lightness although any motor of similar size will work as well.

Thrust line, stabilizer, elevator, and wing must be kept as near the center line of the fuselage as possible, so that roll operation and control will work smoothly during half- and full-roll flight positions. Weight of the plane ready to fly was 19 oz.

The roll principle consists of a yoke or semi-rigid frame which is constructed of steel wire. All yoke joints are bound with copper wire and soldered. Use a minimum amount of solder to keep down weight. Draw temper out of steel wire yoke where sharp bends are required: this will make bending easier.

The yoke is attached at two pivot points on the longitudinal axis of the plane. The front pivot bearing is mounted on engine front bearing housing, preferably on engine timer housing base.



Here is *Flapjack*, ready to be done on both sides!

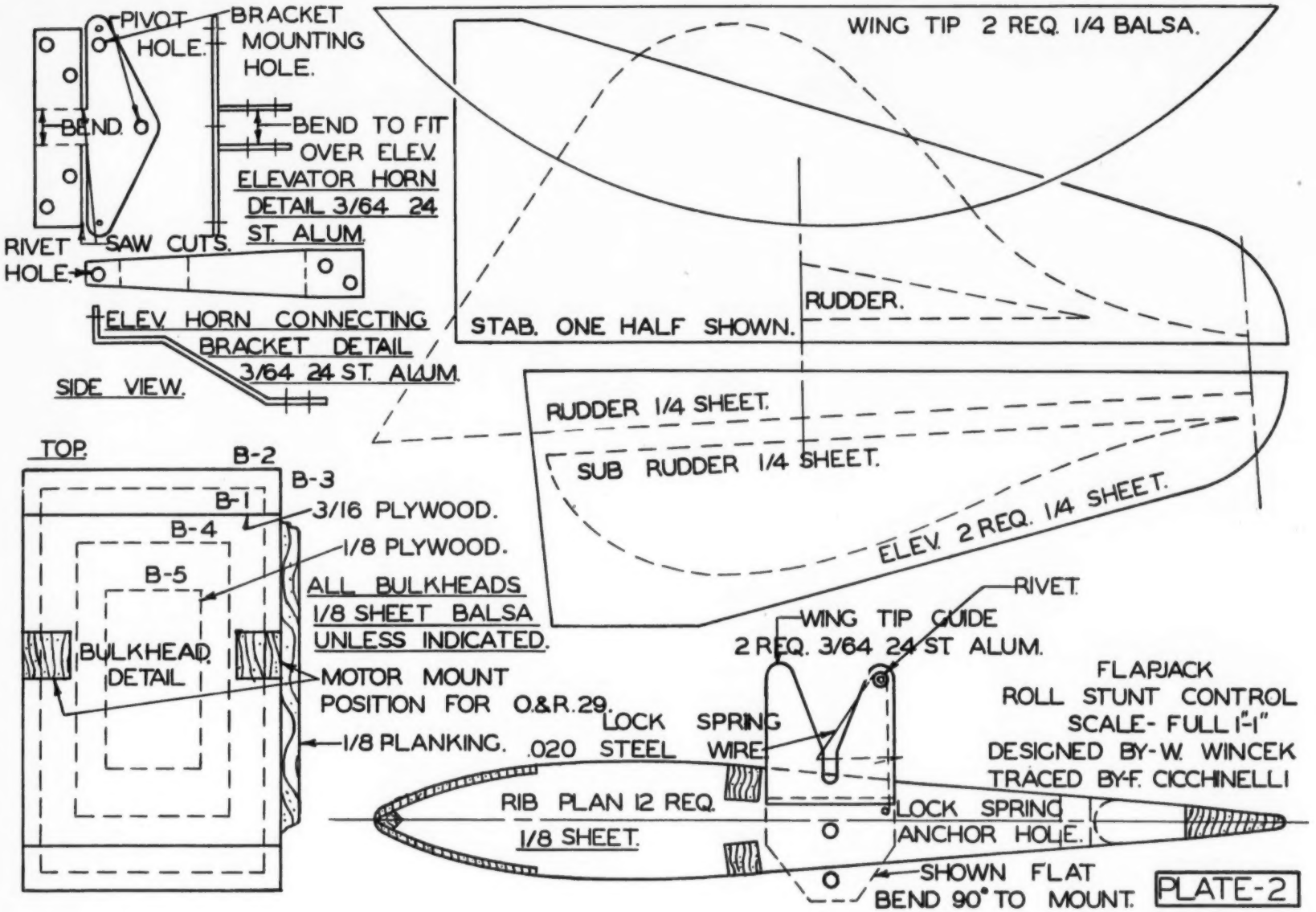
The engine is preferably operated with glow plug, as this eliminates the necessity of a weighty ignition system. The front bearing is a sleeve-shaped piece of copper, or brass tubing, which must fit freely over crankcase bearing housing at the point where timer was mounted. This idea worked out very well.

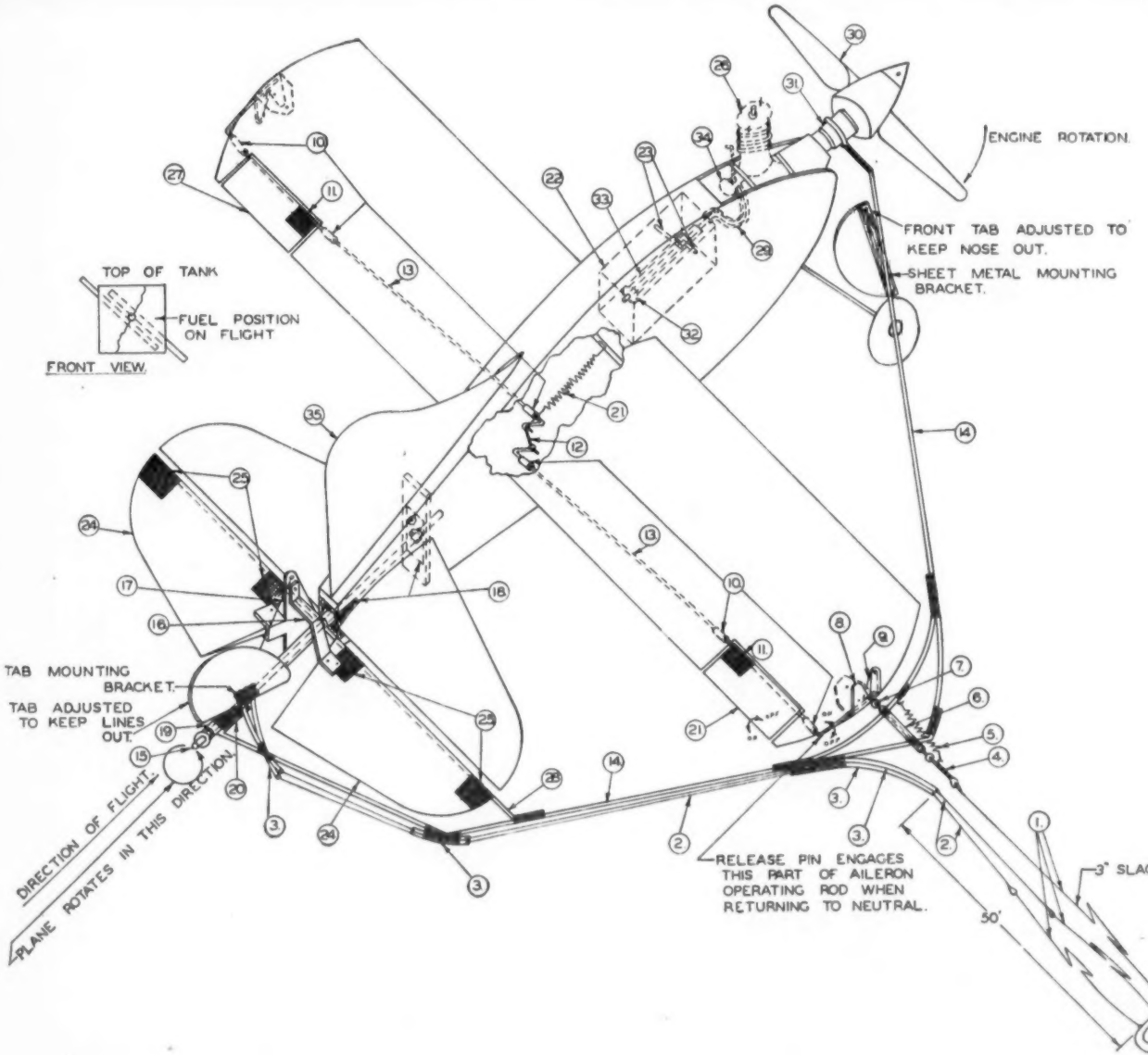
The rear pivot bearing consists of a steel wire shaft which is attached to the fuselage by sheet metal brackets soldered to the rod and then glued and bolted to the tail block and bulkhead. This shaft pivots within a simple copper or brass tube bearing which is part of yoke frame and elevator mounting support.

The plane has one aileron near each wingtip; the model flies in a clockwise direction and the model rolls outward or in a clockwise direction, looking at the model from the front. The ailerons are adjusted to be about 30° down on right wing and 30° up on left wing so that their reaction will tend to roll the plane about its longitudinal axis. This roll direction was selected because the roll action of the plane is aided by the engine torque. This force is very helpful and was considered when designing the roll system. I have found that when the engine is operating at peak power, this torque force is almost enough to roll the model about its longitudinal axis. Through experiment, I have found that torque was great enough to start a roll, but an additional force was necessary to cause the plane to continue to half-roll position, this extra force being supplied by the ailerons.

The plane is kept in normal flight position by wingtip locks which engage with a roll-trip release pin, mounted on the yoke opposite wingtip guide and lock. The roll-trip pin slides in a

(*Turn to page* 38)


PIVOT HOLE.
BRACKET MOUNTING HOLE.
BEND.
BEND TO FIT OVER ELEV.
ELEVATOR HORN DETAIL 3/64 24 ST. ALUM.
RIVET HOLE.
SAW CUTS.
ELEV. HORN CONNECTING BRACKET DETAIL 3/64 24 ST. ALUM.
SIDE VIEW.
WING TIP 2 REQ. 1/4 BALSA.
RUDDER.
STAB. ONE HALF SHOWN.
RUDDER 1/4 SHEET.
SUB RUDDER 1/4 SHEET.
ELEV. 2 REQ. 1/4 SHEET.
TOP.
B-1
B-2
B-3
B-4
B-5
3/16 PLYWOOD.
1/8 PLYWOOD.
ALL BULKHEADS 1/8 SHEET BALSA UNLESS INDICATED.
BULKHEAD DETAIL
MOTOR MOUNT POSITION FOR O.&R. 29.
1/8 PLANKING.
RIVET.
WING TIP GUIDE 2 REQ. 3/64 24 ST ALUM.
LOCK SPRING .020 STEEL WIRE
FLAPJACK ROLL STUNT CONTROL
SCALE- FULL 1"-1"
DESIGNED BY-W. WINCEK
TRACED BY-F. CICCHINELLI
RIB PLAN 12 REQ. 1/8 SHEET.
LOCK SPRING ANCHOR HOLE.
SHOWN FLAT BEND 90° TO MOUNT.
PLATE-2


ENGINE ROTATION.
FRONT TAB ADJUSTED TO KEEP NOSE OUT.
SHEET METAL MOUNTING BRACKET.
TOP OF TANK
FUEL POSITION ON FLIGHT
FRONT VIEW.
TAB MOUNTING BRACKET.
TAB ADJUSTED TO KEEP LINES OUT.
DIRECTION OF FLIGHT.
PLANE ROTATES IN THIS DIRECTION.
RELEASE PIN ENGAGES THIS PART OF AILERON OPERATING ROD WHEN RETURNING TO NEUTRAL.
3° SLACK ON TRIP LINE.
50'

KEY TO PLAN

H....CONTROL HANDLE.
1.....STEEL CONTROL WIRES.
2....CONTROL LEAD-IN STEEL WIRES.
3....LEAD-OUT WIRE BRASS TUBE GUIDES.
4....ROLL TRIP PIN.
5....TRIP PIN RETURN SPRING.
6....TRIP PIN TUBE GUIDE.
7....TRIP PIN LIMIT STOP WASHER.
8....WING TIP GUIDE.
9....WING TIP GUIDE LOCK SPRING.
10....AILERON OPERATING ROD BEARINGS.
11....SHEET METAL AILERON ANCHOR. MOUNTS WHICH ARE SOLDERED TO AILERON OPERATING ROD. FASTEN AILERON TO ROD WITH GLUE AND FASTEN NYLON CLOTH.
12....AILERON REVERSING LINK.
13....AILERON OPERATING RODS.
14....STEEL WIRE SEMI-RIGID YOKE FRAME.
15....REAR PIVOT BEARING SHAFT MOUNTED TO FUSELAGE.
16....ELEVATOR HORN CONNECTING BRACKET.
17....ELEVATOR HORN.
18....SHEET METAL SHAFT MOUNTING BRACKETS.
19....COPPER TUBE REAR PIVOT BEARING.
20....ALL YOKE JOINTS ARE BOUND WITH COPPER WIRE AND SOLDERED.
21....AILERON OPERATING SPRING.
22....ALL-POSITION FUEL TANK.
23....FILLER AND VENT TANK TUBES.
24....ELEVATORS.
25....SHEET METAL ELEVATOR HINGES BIND TO ELEVATOR WITH NYLON CLOTH.
26....OHLSSON & RICE 29 ENGINE USED.
27....AILERONS.
28....ELEVATOR MOUNTING FRAME AND PART OF YOKE NO. 14.
29....FUEL LINE FROM TANK TO CARBURETOR.
30....9-8P "POWER" PROPELLER USED.
31....FRONT PIVOT BEARING.
32....WEIGHT ON END OF FLEXIBLE NEOPRENE TUBE.
33....FLEXIBLE NEOPRENE TUBE.
34....CARBURETOR.
35....RUDDER.

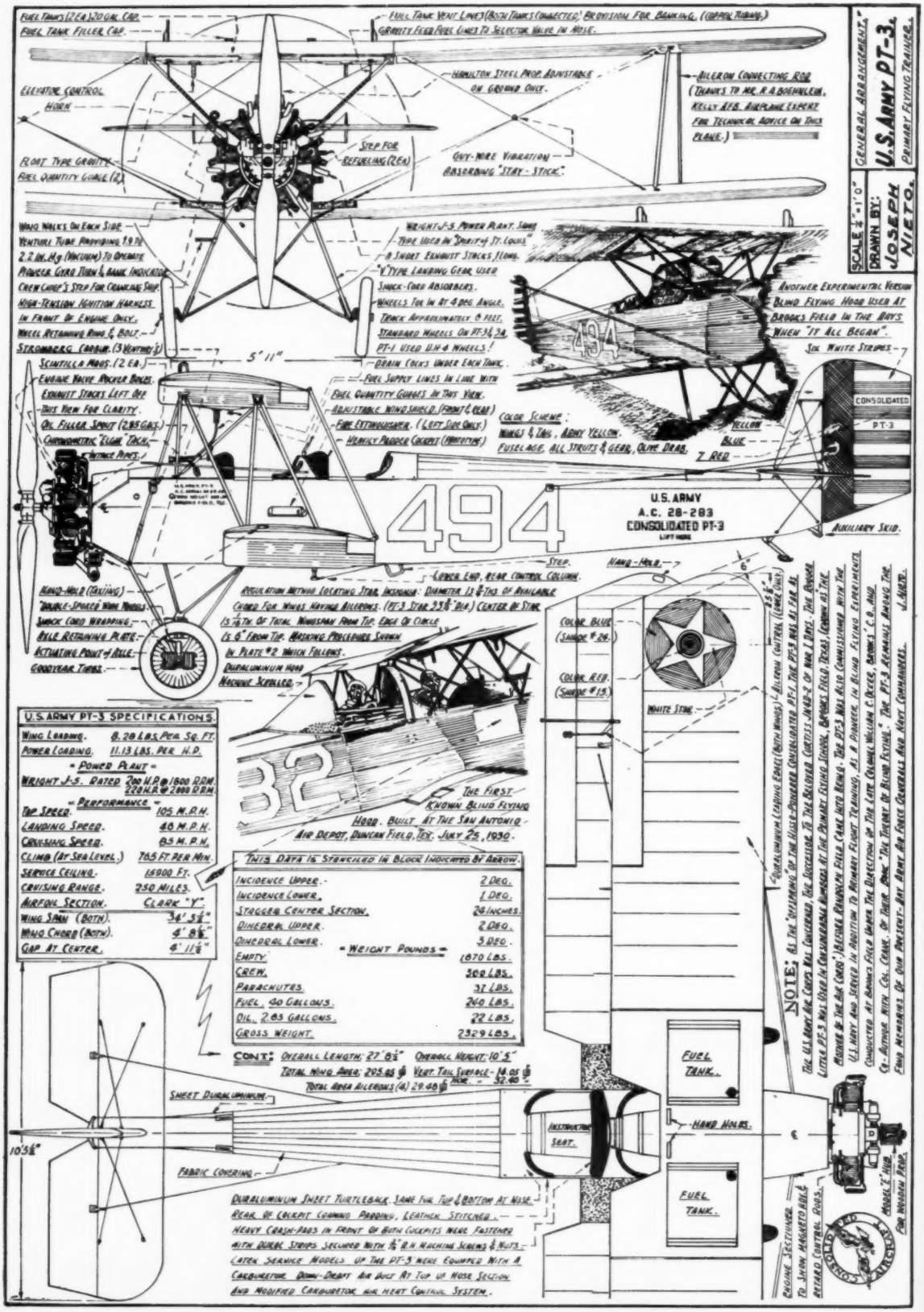
PLATE-3

FLAPJACK ROLL STUNT CONTROL

FEATURES:
NON-REVERSING CONTROLS.
AUTOMATIC AILERONS.
ALL POSITION FUEL TANK.

NOT TO SCALE

DESIGNED BY: WALTER R. WINCEK
TRACED BY: FRANCIS H. CICCHINELLI


GENERAL ARRANGEMENT
U.S. ARMY PT-3.
PRIMARY FLYING TRAINER.
SCALE 1/4" = 1'0"
DRAWN BY: JOSEPH NIETO.
FUEL TANKS (2 EA) 20 GAL. CAP.
FUEL TANK FILLER CAP.
FUEL TANK VENT LINES (BOTH TANKS (CONNECTED) PROVISION FOR BRANCHING. (COPPER TUBING)
GRAVITY FEED FUEL LINES TO SELECTOR VALVE IN NOSE.
HAMILTON STEEL PROP. ADJUSTABLE ON GROUND ONLY.
AILERON CONNECTING ROD (THANKS TO MR. R.A. BOEHNLEIM, KELLY A.F.B. AIRPLANE EXPERT FOR TECHNICAL ADVICE ON THIS PLANE.)
ELEVATOR CONTROL HORN
STEP FOR REFUELING (2 EA)
GUY-WIRE VIBRATION ABSORBING "STAY-STICK."
FLOAT TYPE GRAVITY FUEL QUANTITY GUAGE (2)
WING WALKS ON EACH SIDE
VENTURE TUBE PROVIDING 1.9 TO 2.2 IN. Hg (VACUUM) TO OPERATE PIONEER GYRO TURN & BANK INDICATOR
CREW CHIEF'S STEP FOR CRANKING SHP.
HIGH-TENSION IGNITION HARNESS IN FRONT OF ENGINE ONLY.
WHEEL RETAINING RING & BOLT
STROMBERG CARBUR. (3 VENTING'S)
SCINTILLA MAGS. (2 EA.)
ENGINE VALVE ROCKER BOXES
EXHAUST STACKS LEFT OFF THIS VIEW FOR CLARITY.
OIL FILLER SPOUT (2.85 GAL.)
TACHOMETRIC FLUID "TACH." INTAKE PIPE.
WRIGHT J-5 POWER PLANT. SAME TYPE USED IN "SPIRIT OF ST. LOUIS"
8 SHORT EXHAUST STACKS FLUSH.
"V" TYPE LANDING GEAR USED
SHOCK-CORD ABSORBERS.
WHEELS TOE IN AT 4 DEG. ANGLE.
TRACK APPROXIMATELY 6 FEET.
STANDARD WHEELS ON PT-3 & 2A
PT-1 USED U.H. 4 WHEELS!
DRAIN COCKS UNDER EACH TANK.
FUEL SUPPLY LINES IN LINE WITH FUEL QUANTITY GUAGES IN THIS VIEW.
ADJUSTABLE WING SHIELD (FRONT & REAR)
FIRE EXTINGUISHER. (LEFT SIDE ONLY)
HEAVILY PLADDED CRICKET (PROTOTYPE)
ANOTHER EXPERIMENTAL VERSION BLIND FLYING HOOD USED AT BROOKS FIELD IN THE BOYS WHEN "IT ALL BEGAN".
SIX WHITE STRIPES
COLOR SCHEME: WINGS & TAIL, ARMY YELLOW. FUSELAGE, ALL STRUTS & GEAR, OLIVE DRAB.
YELLOW
BLUE
RED
CONSOLIDATED PT-3
494
U.S. ARMY
A.C. 28-283
CONSOLIDATED PT-3
LIFT HERE
AUXILIARY SKID.
STEP.
HAND-HOLD.
LOWER END, REAR CONTROL COLUMN.
HAND-HOLD (TAXIING)
"DOUBLE-SPACED" WIRE WHEELS
SHOCK CORD WRAPPING
AXLE RETAINING PLATE
ACTUATING POINT OF AXLE
GOODYEAR TIRES
REGULATION METHOD LOCATING STAR INSIGNIA: DIAMETER IS 3/4 THS OF AVAILABLE SPACE FOR WINGS HAVING AILERONS. (PT-3 STAR 33 3/8" DIA.) CENTER OF STAR IS 7/16 TH OF TOTAL WINGSPAN FROM TIP. EDGE OF CIRCLE IS 6" FROM TIP. MARKING PROCEDURE SHOWN IN PLATE #2 WHICH FOLLOWS.
DURALUMINUM HOOD MACHINE WELDED.
32
THE FIRST KNOWN BLIND FLYING HOOD. BUILT AT THE SAN ANTONIO AIR DEPOT, DUNCAN FIELD, TEX. JULY 25, 1930.
COLOR BLUE (SHADE # 24)
COLOR RED (SHADE # 13)
WHITE STAR
AILERON CONTROL (LOWER END)
DURALUMINUM LOADING RINGS (BOTH WINGS)
NOTE: AS THE "INFLUENCE" OF THE WIDELY-PUBLICIZED CONSOLIDATED PT-3 THE BOEING FS-2 AND THE PT-3 WAS AT ONE TIME AS LITTLE PT-3 WAS USED IN CONSIDERABLE NUMBERS AT THE PRIMARY FLYING SCHOOL, BROOKS FIELD TEXAS (HOME OF THE "BIRDS" & THE "BAT CIRCUS") AFTER BROOKS FIELD CAME INTO BEING. THE PT-3 WAS ALSO COMMISSIONED WITH THE U.S. NAVY AND SERVED IN ADDITION TO PRIMARY FLIGHT TRAINING, AS A PIONEER IN BLIND FLYING EQUIPMENT. CONDUCTED AT BROOKS FIELD UNDER THE DIRECTION OF THE LATE COLONEL WILLIAM C. OCKEY, BROOKS C.O. AND CO-AUTHOR WITH COL. CRANE, OF BOOK #2 "THE FACTORS OF BLIND FLYING". THE PT-3 REMAINED AMONG THE FINE MEMORIES OF OUR PRESENT-DAY ARMY AIR FORCE GENERALS AND NAVY COMMANDERS. J. NIETO.
U.S. ARMY PT-3 SPECIFICATIONS
WING LOADING. 8.28 LBS. PER SQ. FT.
POWER LOADING. 11.13 LBS. PER H.P.
= POWER PLANT =
WRIGHT J-5. RATED 200 H.P. @ 1800 R.P.M. 220 H.P. @ 2000 R.P.M.
= PERFORMANCE =
TOP SPEED. 105 M.P.H.
LANDING SPEED. 40 M.P.H.
CRUISING SPEED. 85 M.P.H.
CLIMB (AT SEA LEVEL) 765 FT. PER MIN.
SERVICE CEILING. 16900 FT.
CRUISING RANGE. 250 MILES.
AIRFOIL SECTION. CLARK "Y"
WING SPAN (BOTH). 34' 5 1/2"
WING CHORD (BOTH). 4' 8 1/2"
GAP AT CENTER. 4' 11 1/8"
THIS DATA IS STENCILED IN BLOCK INDICATED BY ARROW.
INCIDENCE UPPER. 2 DEG.
INCIDENCE LOWER. 1 DEG.
STAGGER CENTER SECTION. 29 INCHES.
DIHEDRAL UPPER. 2 DEG.
DIHEDRAL LOWER. 3 DEG.
= WEIGHT POUNDS =
EMPTY. 1870 LBS.
CREW. 308 LBS.
PARACHUTES. 37 LBS.
FUEL, 40 GALLONS. 240 LBS.
OIL, 2.85 GALLONS. 22 LBS.
GROSS WEIGHT. 2329 LBS.
CONT: OVERALL LENGTH: 27'8 1/2" OVERALL HEIGHT: 10'5"
TOTAL WING AREA: 205.85 SQ. FT. VERT. TAIL SURFACE: 14.05 SQ. FT.
TOTAL AREA AILERONS (4) 29.40 SQ. FT. RUD. = 32.90 SQ. FT.
SHEET DURALUMINUM
FABRIC COVERING
10'5 1/2"
DURALUMINUM SHEET TURTLEBACK. SAME FOR TOP & BOTTOM AT NOSE.
REAR OF COCKPIT COAMING PADDING, LEATHER STITCHED.
HEAVY CRASH-PADS IN FRONT OF BOTH COCKPITS WERE FASTENED WITH QUICK STRIPS SECURED WITH 1/4" R.H. MACHINE SCREWS & NUTS.
LATER SERVICE MODELS OF THE PT-3 WERE EQUIPPED WITH A CARBURETOR DOWN-DRAFT AIR DUCT AT TOP OF NOSE SECTION AND MODIFIED CARBURETOR HEATMENT CONTROL SYSTEM.
FUEL TANK.
INSTRUCTOR SEAT.
HAND HOLES.
FUEL TANK.
ENGINE SECTIONED TO SHOW MAGNETO AND RETARD CONTROL RODS.
MODEL'S NOSE FOR WOODEN PROP.

DESIGN FORUM

by CHARLES H. GRANT

HAVE you ever built a model that glides with great steadiness *without* power but performs all sorts of erratic gyrations in flight *with* power? This difficulty has puzzled many model fliers and they have tried to correct the trouble by changing the adjustment or design of their airplane, often without avail. In some cases they may have eliminated the difficulty, but usually changing the fin area is the only change that proved effective. Perhaps an increase in fin area proved satisfactory. If such was the case, you have a strong hint concerning the origin of the difficulty.

Increasing the fin area, as a rule, decreases the tendency of the tail to swing sideways under the action of disturbing forces. Therefore, it is obvious that when better flights result from increased fin area, disturbing directional forces must exist which only increased fin area can overcome. If the erratic flights have been consistent and not merely occasional, it indicates that the disturbing forces originate from the plane itself and not from some incidental external condition.

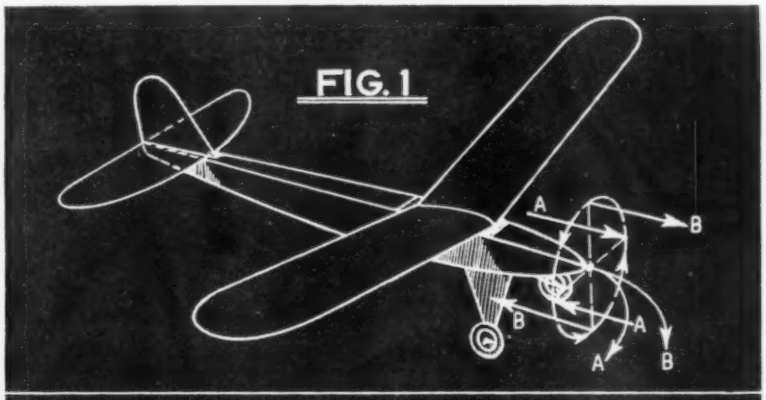
But, what could be a disturbing force that would react under power and not in the glide? If we follow our nose in this respect, the only answer can be that "the factor which produces the power" evidently causes the difficulty. At this point many model builders are stymied. Some attribute the directional instability and right-hand turn and dive to a peculiar reaction resulting from an increase in velocity due to power. It is a common mistake to attribute the condition to plane misalignment. Experience tells us that the trouble may lie in the rotating propeller itself. When turning at high speeds, this produces a gyroscopic effect that causes no unusual reactions as long as the plane flies in a straight line, but which causes all sorts of odd forces when the plane turns to right or left. Now under the effect of propeller rotation it is nearly impossible for the plane to fly straight. First of all, the propeller resistance, or torque, tends to bank the plane to the left when the propeller turns to the right or starboard side of the airplane. At the same time the spinning propeller also tends to swing the tail to the left, thereby nosing the plane to the right while it is banking to the left.

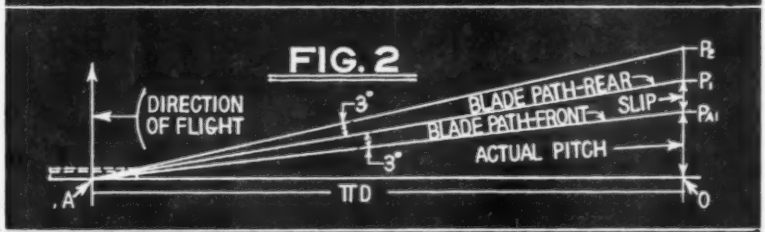
When, for this or any other reason, the plane *noses to the right*, the gyroscopic effect of the spinning propeller causes the *nose to be depressed*. In other words, when the axis of a rotating propeller turns toward the right as indicated by the circular arrow in Fig. 1, or when there is a force tending to push the propeller rearward on the right and forward on the left, there is a reaction due to what is known as "precession" effect. This effect, produced by the movement indicated by arrows A, results in a rearward force B, at the bottom of the propeller arc and a forward force B, at the top of the arc, both of which tend to nose the plane downward. So we have a condition in which, when forces are applied to a spinning propeller as indicated by arrows A, no direct reaction results from arrows A, but instead reactions are produced as indicated by arrows B. As you can see, these effects operate at points which are displaced 90° from the original effect. Consequently, as you may have noted, on occasions when your plane turns to the right, it probably also noses downward.

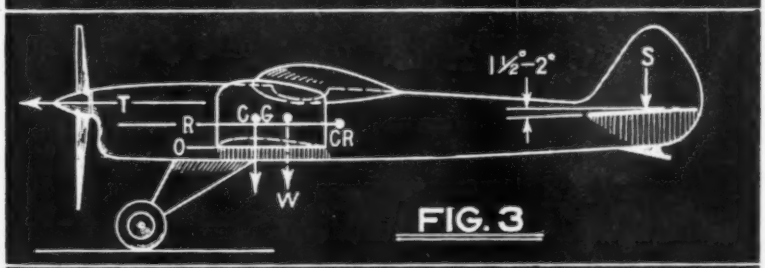
Turning to the right causes the propeller axis to turn to the right and creates the effect indicated by arrows A. This immediately causes a reaction as indicated by arrows B which is a nosing-down effect. If you fly a plane with right rudder so that it turns to the right, it will have a tendency also to nose downward. If you fly your plane with left rudder so that it turns to the left, it will have a tendency to nose upward, because in the latter case the "precession" effect is the reverse of that indicated by arrows B. This will probably answer the questions sent to us by Mr. L. W. Dorricott (Moncton, P.O. Box 56, New Britain, Canada) and similar questions in the minds of many other readers.

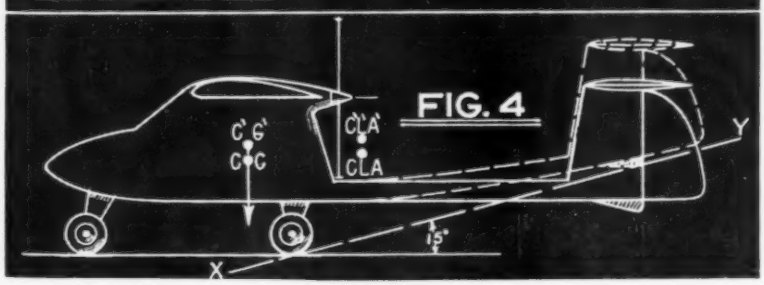
Mr. Bruce Bohi also sends us a letter concerning propeller action, but he is using a propeller combination which will overcome or neutralize the "precession" effect described heretofore. He says he has designed a device which allows counter-rotating propellers to be used, both propellers rotating about the same axis on the same shaft. Mr. Bohi says the device provides for equal rotational speeds for the two propellers. He wishes to know whether the two propellers should run at the same speed to get best results. The answer is quite simple but complicates the mechanism. The *pitch speed of the rear* propeller should be equal to the *pitch speed* of the forward propeller *plus the slip* of the forward propeller. Here you have a problem. In Fig. 2, P_1 represents the theoretical pitch of Propeller Number One (the forward prop). P_{A1} represents the actual pitch. The difference between the two pitches

(*Turn to page* 43)









No. 1 R. Moodie with ship that won its class in 1950 Australian Nats

No. 2 Down in the Kentucky Mountains, Roy Phillips is very active

No. 3 Turkish engine by A. Kocagoz

No. 4 R. W. Miller has had fine results from this free flight pusher

AIR WAYS

MORE RADIO control events, please! The interest in R. C. work is at fever pitch, and is growing all the time. On every week end, and evenings as well (weather permitting!), the radio boys will be found at their favorite flying areas puttering, tinkering, and flying. Yet with all this activity, radio control contest events are few and far between. Some of the biggest meets in the country fail to include the radio control class.

Even the smallest local club contests could very well include R. C. in their free flight meets. The radio boys will not tie up any scarce timers or stop watches; all they ask for is a judge or two who can tell a spiral dive from a snap roll! Local airport operators, ex-service pilots, CAP fliers, all are competent to act as judges. Just provide the radio boys with a spot in which to putter (preferably roped-off to keep spectators from tripping over antenna lead-ins, and tramping on transmitters), and they will give your contest, large or small, a sure-fire center of spectator interest.

This latter consideration, spectator interest, is one of some concern to every contest director. It is of the greatest importance to have a large number of non-model building spectators at every meet; just add radio control to your list of events, and watch the spectators flock in to see the fun.

So, what say, contest directors? The R. C. event is simple to run, takes little in equipment and manpower, and is a proven attention-getter. It's up to you!!!

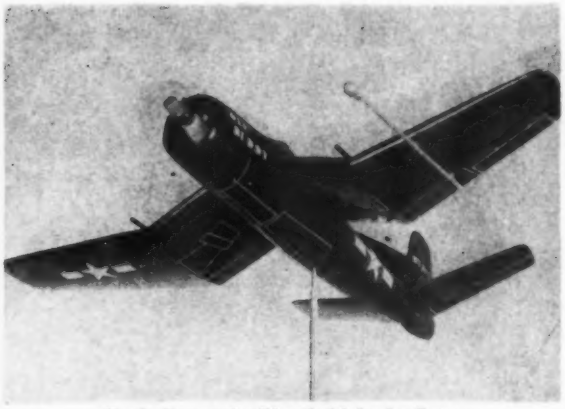
COOPERATE WITH your local civic authorities—don't fight with them. This seems to be the lesson to be learned from the

NEWS OF MODEL AIRPLANE EXPERIMENTERS ALL OVER THE WORLD

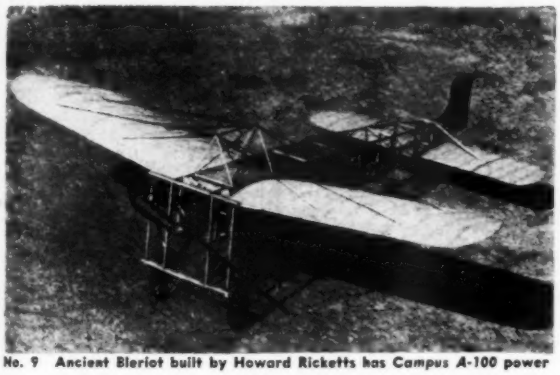
No. 5 7' span Stinson by Bill Oeder has Burgess M5 5-cylinder motor

No. 6 Les McBrayer won trophy with this ship in Proto Speed race

No. 7 Class A "Pencil Bomber" is the work of Stephen Ditta



No. 8 Very neat solid scale job by Joe Broun



No. 9 Ancient Bleriot built by Howard Ricketts has *Campus A-100* power

No. 10 PAA-Load original ship, design of Bob Higgins

story on page 17 of this issue. Model builders in small towns will immediately say, "Sure, but Los Angeles is a large city, with lots of money, park space, and manpower available." This is true, but what has been accomplished in the Los Angeles area, can be duplicated on a proportionate scale in any other community. The important point is that you should approach your local authorities *before* they approach you—because if they come seeking you, the chances are that some irate citizens have besieged them with demands to "stop that infernal racket." Hard as it is for model fliers to understand, most of the citizens prefer to read their Sunday paper or take their week-end siesta *without* a background roar of model engines.

As soon as there are a few model fliers in your locality who like to get together and fly in built-up areas, *then* is the time to form a committee of your most influential fliers and call on the local authorities. If you continue to fly until the surrounding citizens force a ban on flying in the town, it is usually too late to do much about it.

So form your committee early, visit the authorities, invite them out to see you fly. And right here again, let's emphasize that *NOISE is the top problem.* Every community has school grounds, parks, parking areas, etc., so if you lick the noise problem, space (at least for controline flying) is a simple matter. There is only one way to cut noise—that is by use of mufflers. You will note that mufflers are mandatory in the Los Angeles rules. Sure, we all know mufflers add weight, expense, drag, and perhaps reduce engine efficiency, but isn't it better to suffer a slight penalty in all these categories, so you can have the great advantage of flying on near-by convenient areas, rather than having to fly with one eye cocked on the nearest road, to spot the approaching cops?

The conclusions are obvious: 1—Get your story to the local authorities before the complaints start pouring in; 2—Convince the authorities of the value of your hobby in order to gain their cooperation in setting up flying areas; 3—Put mufflers on your ships when flying in congested areas . . . if you do this, chances are that there won't *be* any complaints!

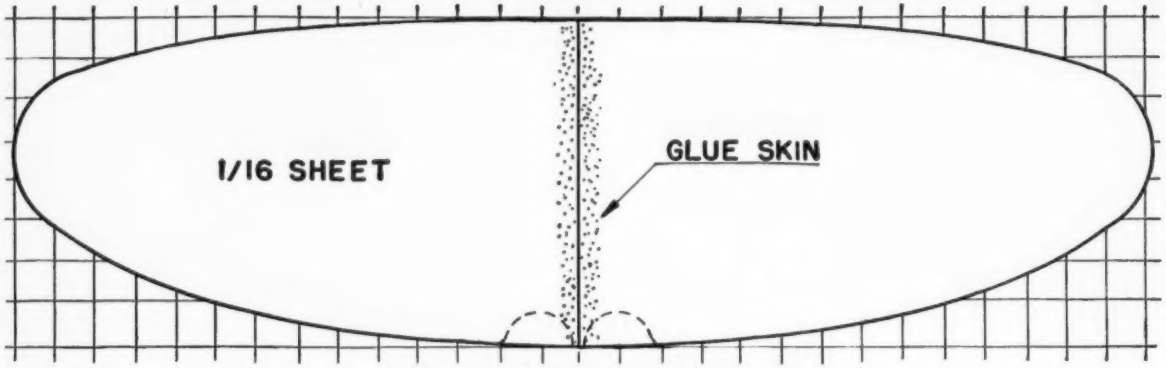
* * *

Picture No. 1 was submitted by Clarence Pearce (133 Swan Street, Richmond E. 1, Victoria, Australia) and shows Mr. R. Moodie with his free flight job which won the "under 3.5 cc."

(*Turn to page* 40)

No. 11 English speed ship, Cyril Shaw—pilot

No. 12 Another English model, Ray Booth's free flight scale Avro 504K



WEIGHTS:

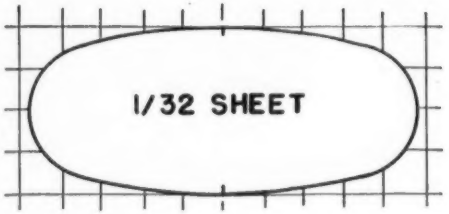
INDOOR — 1/10 OUNCE

OUTDOOR — 3/4 OUNCE

NOTE: FOR HIGH CEILINGS INCREASE INDOOR WEIGHT.

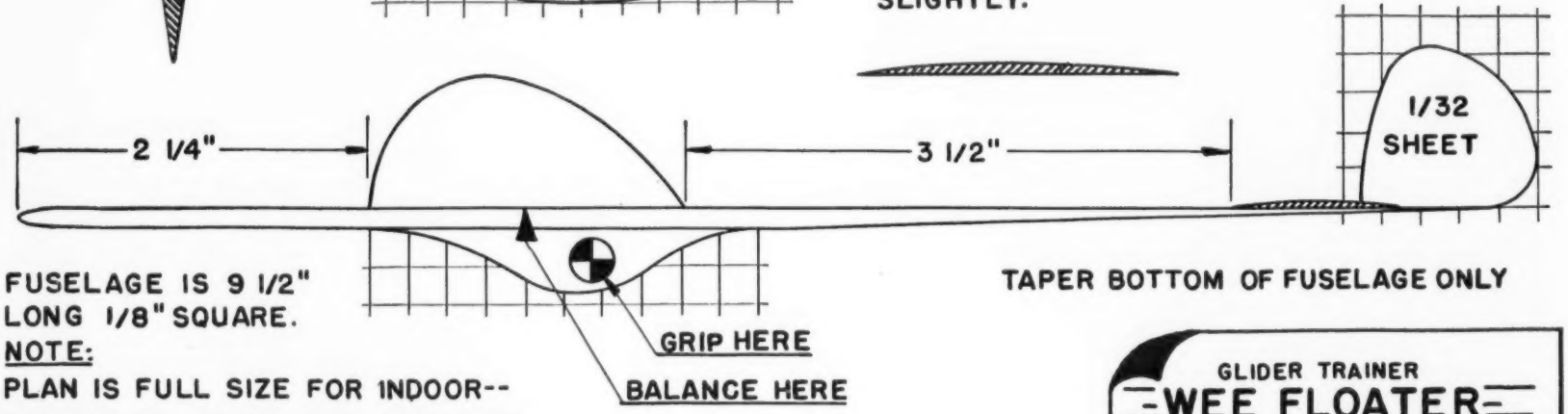
WING GRIPS ON OUTDOOR ONLY

CROSS-SECTION UNDER WING-- ROUND OTHERWISE.



FLY TO RIGHT,

WARP TRAILING EDGE OF RIGHT WING DOWN SLIGHTLY.



FUSELAGE IS 9 1/2" LONG 1/8" SQUARE.

NOTE:

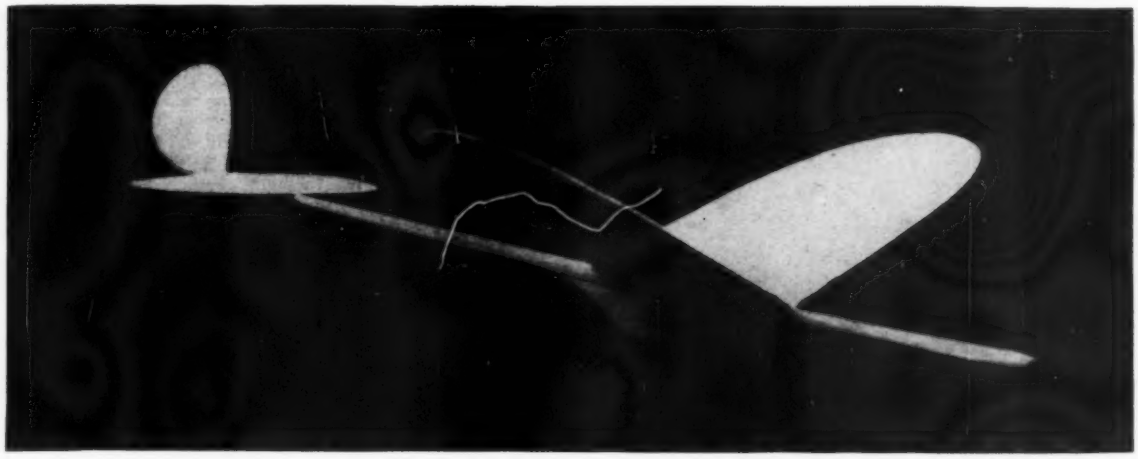
PLAN IS FULL SIZE FOR INDOOR-- DOUBLE ALL SIZES FOR OUTDOOR!

TAPER BOTTOM OF FUSELAGE ONLY

GLIDER TRAINER

WEE FLOATER

BOB BURAGAS



WEE FLOATER

by BOB BURAGAS

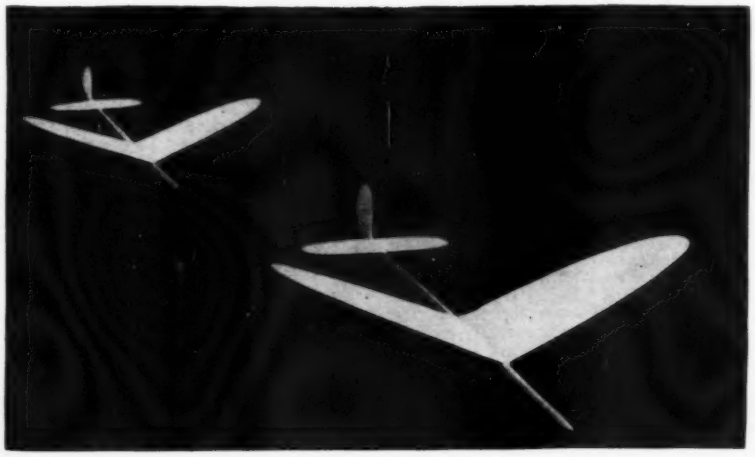
HAVE you ever found that you have forgotten how to fly a hand-launch glider? Well, I did. Not having flown gliders for some time I felt the need to put some oil on the rusty hinges.

The result was a hand-launch trainer that could be flown indoors; it was flown this way so that performance could not be blamed on the weather. Since the model is light and stable, it does not require a back-breaking throw to gain altitude. A slight push and it zooms right up to the ceiling. With practice in adjustment, the model will roll out into the flattest glide you have ever seen. A sinking speed of one foot per second is average!

After a few hours of enjoyable practice, you can satisfy the urge to build an outdoor glider by building the model double size; one of the illustrations shows the two sizes of gliders. Then you can lean back and give it all you have, knowing that you can handle the launch and adjustments. The zippy climb and tight roll at the top make the larger ship a pleasure to fly. The keynote of construction is simplicity. All of the inherent characteristics necessary to produce high performance flight are included. Beginners will find this an easy model to handle and no slouch when it comes to flying.

Before you start building, it pays to mark out the flying surfaces on a piece of cardboard; then cut them out for use as templates. This way you may be sure that all parts are marked correctly and are symmetrical. When the glider is completed, you can put these templates away so that you will have them when you want to build another model.

Choose your wood carefully. Very light stock is best for the indoor version, but the fuselage should be of very springy 1/8" square balsa. The larger version requires a more substantial grade of wood; a 1/4" square pine fuselage was used on the original, but balsa can be used if it is very hard. When making the wing for the outdoor version you will have to laminate the wood using two sheets of two-inch wide balsa. Make sure they are flat so that the edges meet evenly. Do not attempt to cut the outline until the glue joint is dry! The finger grip grooves are not cut into the wing until the model is finished. The indoor version does not need them.



Now that you have chosen your wood, use the templates mentioned above to mark out all of the parts. A soft pencil is best. Cut these parts out and sand the outlines smooth. The following procedure will assure you the fastest construction time.

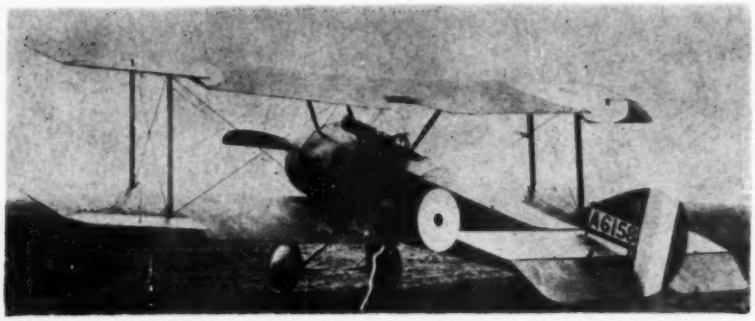
Measure the location of the finger grip on the fuselage and glue into position. Let this dry while you work on the flying surfaces. The center of the wing and stabilizer should be pencil-marked to aid in proper location. When sanding these parts, work on the opposite side so that the marks will not be sanded off. Use a medium fine paper such as 2/0 so that sanding does not leave large scratches. Deep scratches will weaken the wood. Work in the airfoil shape carefully so as not to break the edges. When finished, cut the wing in half and glue in the proper amount of dihedral. Don't approximate—measure it, for best results. Spread the glue evenly along the edge of the wood. A poor wing joint will not hold long during active flying.

By this time the fuselage should be ready to work on. Use a straight edge to taper the lower part of the fuselage. The top is not tapered because the tail is mounted with zero degrees incidence, relative to the wing. Carve the finger grip to the indicated cross section and round off the edges roughly. Sand the fuselage until it meets the required cross section. If any warps show up, they can be steamed out over a kettle. Take care when doing this job and steaming will not be required.

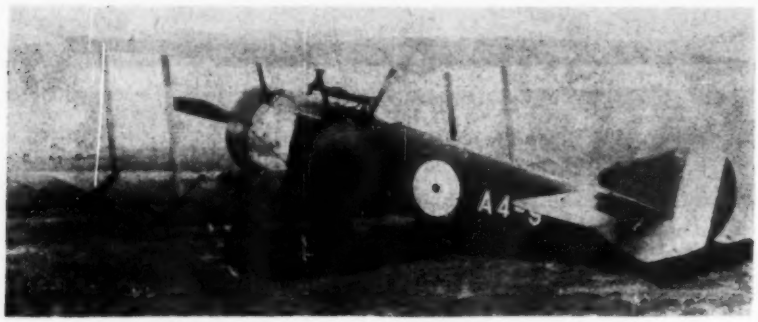
Mount all of the parts in position, using a liberal amount of cement and pin them. Check alignment by sighting down the fuselage from the front and rear. When you are satisfied that this is correct, put the model away to dry. Fillets of glue are added to all joints later; also apply a thin skin of glue to the upper side of the dihedral joint. When dry, sand the model smooth with a very fine grade of paper. Don't spare time on this stage as it is important to the finish. The indoor version is now ready to fly.

For a durable finish, the outdoor glider should be doped. Use about seven coats of thin dope and sand with fine paper be-

(*Turn to page 52*)



100 hp *Pup* had adjustable stabilizer—note slot in fin above the "8" for adjustment mechanism



80 hp machine, an early model with fixed stabilizer, and camera gun in front of cockpit

WORLD WAR I

by ROBERT C. HARE

These *Pups* were used as advance trainers. Wing loading was very light, and landing speed low

PART ONE · · SOPWITH PUP

OUR World War I airplane under discussion this month is the Sopwith *Pup*. In the past we have used many superlatives in describing various 1914-1918 aircraft, and of course the claims made have been with regard to contemporary aircraft of the same class. We shall also make some flattering claims for the *Sop Pup*, but first, let us take stock of the situation at the time of its introduction at the Western Front, in March, 1916, and take a peek into its background. We shall then be able to see why a ship used for advanced training in 1917 and for messenger work in 1918, was a first-line fighter in early 1916.

Generally speaking, every airplane developed during W.W. I was an "interim" aircraft; that is, each was put into service either to exploit an advantage over the enemy, or to meet an advantage held by the enemy. Most every aircraft type of the period had an effective life of about twelve months from the time it first reached the Front until it was replaced by another type. There was a "peak" period of roughly four months during which any one type was actually kingpin in the air. And at the end of each peak period, there were one or more types beginning to trickle to the front, bringing with them improvements that would obsolete the previously "best" ship.

Obviously, the nation with the advantage of some sort evident in their latest aircraft, held control of the air. Now control of the air should not be confused with supremacy in the air. Control simply means that the side having it can take the offensive, or can make it nearly impossible for its opponent to operate effectively. A nation supreme in the air is one which can operate without interference from its enemy, and can even prevent the enemy from operating at all.

ANSWER TO ADVANTAGE. Until June, 1915, flying men of the warring nations had flown a fairly safe air-war, potshooting at one another with hand-held carbines, shotguns, and service pistols. Some of the essentials for full-fledged air-war were present at the time. There were single-seat scouting planes, like the Fokker monoplane, and light infantry machine guns, like the Parabellum. Roland Garros, a French single-seat scout pilot, had tried to gain the advantage over the Germans by mounting a machine gun on his plane and affixing steel wedges to its propeller, in line with the bullet's path. This arrangement didn't work.

A young man in Germany, Anthony Fokker, had a similar idea. *His worked.* And in June, 1915, the first Fokker monoplane fitted with a synchronized Parabellum machine gun took to the skies over the Western Front. By autumn, 1915, there were six such Fokker monoplanes knocking Allied aircraft out of the sky with alarming regularity. By the end of the year, five German pilots had made kills with the Fokker: Boelcke and Immelmann, 5 each; Parshou, 3; Von Althaus, 2 and Wintgens, 1.

Germany had the advantage, and control of the air. The Germans played it smart, though. They stayed on their own side of the lines. However, they prevented effective reconnaissance of their territory by the Allies. That was the extent of their control of the air, but it was enough to make the Allied effort behind their lines negligible.

The Allied solution to the problem was to develop an airplane equipped with a synchronized gun that could meet the Germans on even terms. If the Allies could effectively protect their reconnaissance aircraft over the German lines, the German advantage would be lost.

This solution was apparent late in 1915, and the French equipped their Nieuport 11 scouts with guns firing over the top arc of their propellers and began to meet the German synchronized-gun Fokkers on more equal terms.

THE SOP PUP. On the English sector of the Western Front the solution was found in an entirely new type airplane, the Sopwith *Pup*. This little plane has been called "the most delightful machine in the world to fly" by the men who flew it. For the purposes of our story, however, the heritage of the *Pup* is worth mentioning.

In 1912 and 1913, the general concensus was that the monoplane was the type to choose if you wanted to design an airplane for speed. You will remember, or you may have heard, that the Gordon Bennet Cup Races of those early days were won by "super-slick" monoplanes like the Deperdussin, with its monocoque fuselage, highly streamlined landing gear, and 160 hp Gnome engines—and their winning speeds were about 125 mph.

Well, in 1913, a Sopwith test pilot named Harry Hawker (later of Hurricane fame) wanted a fast airplane built for him to take to Australia on a sales tour in 1914. The Sopwith people built a beautiful little biplane called the *Tabloid*, powered by an 80 hp Gnome engine, and with a speed

(*Turn to page* 39)

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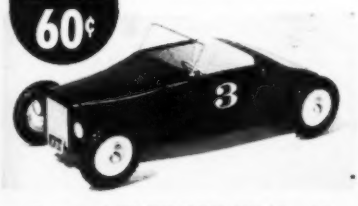

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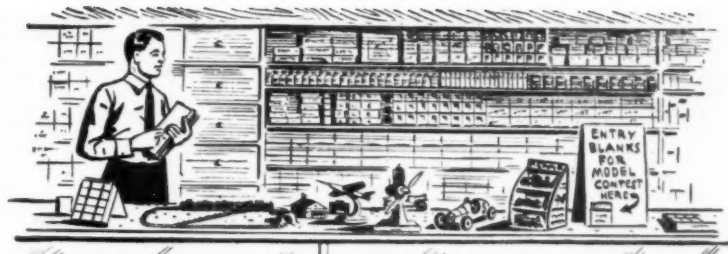


HOBBY COUNTER

Conducted by THE TRADE OBSERVER

BILL ATWOOD (Atwood Mfg. Co., 4738 S. Durfee Rd., Pico, Calif.) just sent us the news about the *Atwood Wasp*, an .049 baby engine which he should be delivering from July 1st on, just about the time you will be reading this report. Selling at $5.75, the *Wasp* is packaged to include the motor mount, fuel tank, prop, wrenches, glow plug.

The Atwood company also announces a price drop for their *B & B Micro-tanks*, to $1.45 on the "29" size, and $1.70 on the "49" size. As you should know, the *B & B* tank accomplishes every troublesome fuel control and mounting problem in one simple installation; it's a fuel tank, motor mount, and flight timer. Available for all *Atwood Triumph* engines, all *K & B Torpedoes*, the *Ohlsson 19, 23, 29*, and *33*.

* * *

New items from K & B Manufacturing Co. (224 E. Palmer St., Compton, Cal.) include the *Slip On* connector which may be used with any glow plug now made for engines in .020 to .074 sizes, and some .099's as well. K & B also announces a new glow plug designed expressly for higher conductivity and low battery drain. Special insulation will withstand terrific heat.

* * *

If you'd like to try your hand at U-control without making a special controline model, or at free flight without making a F.F. model, you can have your cake and eat it, too. *Top Flite's* (Top Flite Models, Inc.—formerly American Hobby Specialties, Inc.—2635-45 S. Wabash Ave., Chicago, Ill.) *Lil Rascal*, a combo free flight and controline job for .020 to .074 engines is the answer. Designed by Carl Goldberg, it features *Jigtime* construction, a new and revolutionary method of construction. Clean edged die-cut parts, that are keyed to fit only in their proper places, insure the beginner of a good job and the expert of time-saving assembly.

Flown free flight the *Lil Rascal* shows a steady climb and nice glide; controline, it jumps off quickly, answers controls smartly, and loops excellently. To convert from F.F. to ukie, you hook up the lines and loosen the bellcrank so the elevators move freely. Price is $1.50.

* * *

For five cents under nine dollars, you can own what is truly a remarkable pylon kit, *including* a K & B *Torp Jr.* It's a scale kit of the Douglas Navy *Sky Raider;* one of the most complete jobs it has been our pleasure to examine. Contents include not only the engine, but prefabricated plastic parts, prop and spinner, built-up *Froom* tank, built-up landing gear, aluminum rubber-tired wheels, clear canopy, decals, hardware. Who makes this bargain? Allyn Sales Co. (6425 McKinley Ave., Los Angeles, Cal.).

* * *

The local boys are right excited over the $9.95 *McCoy 29*. It just sounds right! A little different, too. Originally, McCoy (Duro-Matic Products Co., Hollywood, Calif.) made a great reputation with their *Red Head* speed engines, which eventually came out in 19, 29, 49, and 60 categories. In fact, the *Red Head 19, 29*, and *60* still are going great guns. Then, feeling out the lower-price field, they brought out the *Sportsman Jr.*, or *36*, and the *Sportsman Sr.*, a 547. These engines still had the air intake and needle valve behind the crankcase, a feature making for top revs but not for bottom prices. Then along came the *Sportsman 29*. It looks now as if Duromatic has streamlined the whole deal with their hot 19, 29, and 60 *Red Heads* and a parallel low-cost line in the 9, 19, and 29 sizes.

* * *

Matty Sullivan, the Philadelphia model flier and manufacturer of wire and allied items, has introduced the first item in a new *Instant-Use* series. Manufactured by Sullivan Products (214 W. Dauphin St., Philadelphia, Pa.) and priced at 25c, this is the Instant-Use 6-ft. flexible lead cable, with two made-up ends, ready to attach to your flying wires. The cable is 21 strand, rather than the regular 7 strand. The 6-ft. length may be trimmed to suit the distance from bellcrank to the wing tip.

* * *

Random Notes: Run, don't walk, to your nearest dealer for your new *Ohlsson* engine (Ohlsson & Rice, Emery at Grande Vista, Los Angeles, Calif.) and free kit. You have your pick of almost any kit in the shop. This by way of O & R's fifteenth anniversary. Let's hope for many more of them! You fellows couldn't have missed those ads! Through the years, the O & R's, especially the perennial *23*, have been a great favorite with the average hobbyist. O & R themselves probably wonder where so many tens of thousands of engines could have gone . . . . Tired of soldering on wheel retaining washers? Why be prehistoric when you can get either the easily installed *Kap-Pak* hubs for 1/8 wire at 15c, or the *Veco* collars for 3/32 and 1/8 wire, at 20c. You know the saying, if you don't see what U want—ask 4 it. With hubs or collars you can switch wheels from ship to ship . . . . Marine Model Co. (Halesite, N.Y.), has a corking scale-model sailboat that really sails. Called the *Sailfish*, priced at $1, has lovely sheets of mahogany for deck and hull bottom . . . . . If you go for boats, Comet Model Hobbycraft, Inc. (129 West 29 St., Chicago, Ill.), long has had two excellent sellers in their 50c and $1 sizes of the *Gypsy Sloop*. The *Gypsy Sloop* is particularly strong on detail and plans. Paul How-Does-He-Do-It Guillow (Wakefield, Mass.), is responsible for those 10c R.O.G.'s, profile printed jobs that resemble sport planes, transports, or army attack jobs. Span is 8 inches and they really work . . . . As we told you last month, the Glo Engine Handbook, at a dollar, and written by Bernard Winston and Jack Bayha is well on the way to busting sales records. Published by the American Hobby Center, Inc. (156 West 22 St., New York, N.Y.) it covers the entire field of glo engines like a blanket. Nothing you can possibly think of, has been left out. What more to say? Even though 50,000 copies are being printed, you'd better stake a claim on one. Now!

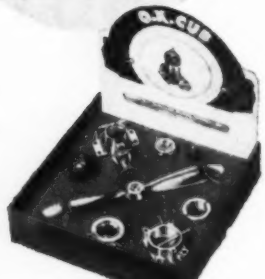
SAVE $1.20

Assemble it yourself!

Complete instructions — anyone can assemble this engine in 15 minutes. All engine parts precision machined.

.049 CUB POWER KIT

OK



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HERKIMER TOOL & MODEL WORKS INC.
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Scrap Box

(*Continued from page 2*)

that both the useful full-scale sections and also the better model sections (as typified by Gilliam) have a noticeable family resemblance. When you study the facts that determine whether a section is useful for low Reynolds Numbers, as recently laid on the line by Charlie Grant, Lippisch, and others, you grow doubly sure of this. Over the past year, the writer had been getting excellent results in rubber with the NACA 4612 and now, pointing up the relationship of good sections in the model field, George Delamater, prominent St. Louis builder, has showed us that the ordinates of the 4612 median line and of the old standby Eiffel 400 are almost identical. This was all the more interesting because the Eiffel 400 had been giving results that, for efficiency, at least equaled the 4612. Was it that old fox, Frank Zaic, who said, "So you just draw an arc and . . ."

If someone would put down in a paragraph the few essential facts for laying out a model section, probably just an extension of Zaic's remark, all of us could rest assured that we had the best wing section possible for our rubber or free flight gas job, without consulting crystal balls or boiling rare roots. This gets around to our current pet peeve—the flat-bottomed airfoils. Far from admitting that their wide use in contest free flights proves them efficient, we feel that they prove the free flight ship is no more scientific than the average all-wood hand-thrown glider. In fact, the free flight may be falling into a deadly rut.

One of the most interesting indications of the size and scope of the model plane hobby is the phenomenal success of various low-priced books brought out by the Winston Publishers, the latest being the GLO-ENGINE HANDBOOK, by Bernard Winston and is-you-or-is-you-ain't-a-pro Jack Bayha. The Winston brothers are the brains of America's Hobby Center, whose ads list enough items to keep you busy on a rainy day. Bayha is a bit of a radio whiz. The GLO-ENGINE HANDBOOK sells for $1. We see by the stack of page proofs—the book was on the presses as this was written—that there are fourteen chapters, such as Theory of Operation, Trouble Shooting, Breaking in, Design Features, and the copy develops the topics well, rather a practical, down-to-earth approach, with quite a few black and white illustrations. Good bet for clubs and others on the prowl for stuff to feed to the beginners, as well as for individual use. If past experience holds, the 50,000 HANDBOOKS printed will be none too many. For a dollar it's a fantastic value.

The electrifying news that the Macnabb transmitter has been approved by the FCC has left everyone in a state of shock. The air is thick with questions and rumors and, from sheer force of habit, with misgivings about the FCC. As has been typical of this whole fantastic development of a practical transmitter and receiver on the Citizens Band that does not require the familiar amateur operator examination and license —instead, you simply fill out form 305— Macnabb himself seems to be the only guy who knows where North is. We are not talking about the radio equipment manufacturers, but about the leaders who first learned the news.

There's quite a story behind this Citizen Radio business. When the *"Scrap Box"* began to support radio control by reporting the blow-by-blow struggle of our industry to get around the all but impossible code and written exam which a modeler would have to pass in order to press a button that turned his rudder—all manner of people contributed a variety of off-the-cuff ideas. The Citizens Band was presumed so impractical, if not impossible, that it had not been mentioned to us until Macnabb told us flatly, "this is it—here is the radio."

Now some really sharp minds have been toiling with other Citizens equipment but, so far, to little avail. One nationally known radio expert commented in a science magazine on the hair splitting requirements for such transmitters, a kind of polite debunk-

ing expedition. The writer once hinted to a major manufacturer that he had better keep an eye on the license-free developments. He was told that if operations were to be on 27 mc. (27 mc. is a proposed Citizens Band), a little coil could be adjusted with no difficulty at all, to convert from 52-54 to 27 mc., but if the equipment was to work on the 465 mc. Citizens Band, why, of course, that was impossible. At that time, we had been flying for at least two months, with simple 465 mc. equipment!

Now that we are getting around to the hangar flying department, it's surprising how many entrants in the story event think a radio model with a please-return-if-found sign is worth a subscription. Probably a sad commentary on the art of R.C. but our own jobs carry the same notice. Keep it up, gang, you make us feel real good! It's like those U-control jobs that keep breaking loose and flying unscathed free flights for miles. Put a little dihedral in one of those big stunters and you've practically got a free flight; eight ounce wing loading—what's the diff? Happens so often, it is commonplace. What we need is a real old-fashioned, corny yarn, and trust a couple of rubber modelers to give it to us.

Turn back the clock to 1940. The scene, the Mississippi Valley Meet, which was then a kind of second Nationals. So these two builders stretched out the rubber, packed in the turns, and turned her loose for a very nice five-minute flight. After the chase and the slow walk back, the boys put the model in their car and went out on the field. There was the timer, watch in hand, still gazing aloft. Careful not to startle him, the boys joined him, saying nothing. At 19 mins. the "model" suddenly flapped its wings!

Yours is the monthly free subscription to MODEL AIRPLANE NEWS for the best tall but true flap of the month, Carl Loehle, Louisville, Kentucky.

Model Pitts Special

(*Continued from page 11*)

The wings can now be water-sprayed and, when dry, clear-doped three times with fine sanding between each coat. Add the fin and rudder, and be sure to offset the rudder as required. Fillet the wing and tail to the fuselage with cement. Several coats are required. Use 1/8" sheet balsa to fill in the space between the landing gear struts. Fillet these to the fuselage with cement and apply *Sanding Sealer* to these and to the tail surfaces. Bend the tail wheel strut and attach to the fuselage. Cut the wheel pants to shape, hollow and sand smooth; these are added at the same time as the wheels. Fillet generously with cement and apply *Sanding Sealer*.

While the fillets are drying, the cabane and interplane struts are cut to shape. Install the interplane struts by forcing them into the fuselage top about 3/16" and applying plenty of cement.

In view of the fact that so many engines could be used in this model, we decided to use bulkhead beam mounts. *Air-o* steel mounts were used. These are screwed onto the bulkhead with round head wood screws. First, carefully cut the cowl hatch off along the line indicated on the plans. Install the mounts and bolt the engine to them. The nuts can be soldered to the steel mounts. Install the tank. Any commercial tank of the approximate size shown will do. Carefully cut away the cowl for the engine cylinder, needle valve, filling and vent lines etc. Fuelproof the cowl interior. Spot cement the cowl hatch in place again.

It is advisable to paint the model before attaching the top wing. We painted the entire model white first. Four coats were used, with each coat thinned a little more as we went along. Before the last coat was applied, we added the bubble canopy. This was cut down from a large standard canopy purchased from the local hobby shop. When the white paint is thoroughly dry, mask off the white portion and paint the forward fuselage half, landing gear, wing leading edges, bottom surface of top wing, and struts a bright red. Two coats should be

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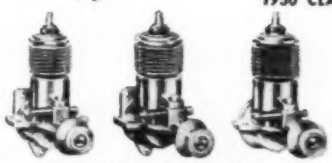

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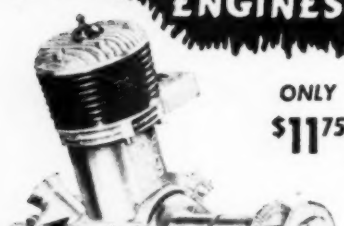

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enough but more won't hurt, All license numbers, sunburst design and checkerboard were cut from red *Trim-Film*. This is very easy to work with and insures a good job. The checkerboard on the underside of the tail is standard *Checkerboard Trim-Film;* however, the checkering under the lower wing is made by cutting 1" squares of *Trim-Film* and applying it from corner to corner as the photograph shows.

Generally it is quite difficult to letter anything directly onto a model, therefore try this trick for the lettering on the fuselage side as well as the "skunk" behind the cockpit. Most stationery stores can supply you with a product called *Duro-Seal*. This is a gummed cellophane sheet with a waxed paper backing. It will take ink quite well if it is first gone over with drafting pounce or an eraser. It is also transparent while still on the backing. Letter what is required, cut it to size, peel off the waxed paper and stick the cellophane to the model, press in place with a cloth and it's done! No glue is required.

Cement the interplane struts to the lower wing, forcing the prongs into the strut foundations. Apply plenty of cement. When dry, the upper wing can be added by forcing both the interplane and cabane struts into it and cementing liberally. Fuelproof (*Comet* proofer was used in this case) the entire plane and add the button thread rigging. The wing rigging is attached to celluloid anchors which simulate the fairings on the full scale plane. The celluloid is cemented to the wing. We used a *Froom* spinner, but a plastic or wooden one will do.

The model must balance as the plans indicate. The addition of lead weight in the nose or tail will remedy any unbalanced condition. The length of lines as well as the thickness will depend on the power used. Our *Bantam .19* job was flown on 40' (.008") steel lines, however, lengths up to 70' can be used with larger engines. The lines must also be heavier. The prototype model was flown with cowl hatch removed but this is not necessary as long as an exhaust escape is provided. Take off downwind and we suggest flying from a paved surface. The model leaves the ground with hardly any roll so do not try to "lift it off." Do not fly in windly weather unless you are sure you can handle the model perfectly. When built and flown with care, you will be the proud owner of the snappiest model on the flying field.

Tomahawk

(*Continued from page* 19)

otherwise you will experience trouble later, trying to get the component parts aligned with respect to each other. To complete the fuselage framework, carve the nose block, then the balsa fin which rounds out the rear end of the fuselage. Cement the wing supports or runners in position, and add the remaining accessories, such as gussets and wing pegs.

Rear Wing. Since the main supporting surface has a large main spar, wing construction should start with cutting and cementing this spar to form the correct dihedral angles. This is done by pinning down each section of the spar on the full size dihedral layout. Do not apply too much cement at the joints, otherwise it will be difficult to get the dihedral gussets to fit flush on the spar. Cut out the dihedral gussets and cement them in position on the side that is up, while the spar is still pinned to the board. This eliminates any possibility of incorrect dihedral angle. After the dihedral joints have dried thoroughly, the spar can be lifted from the plan and the dihedral gussets applied to the opposite side.

If you have not as yet cut out the ribs, do so now. It is very important to be as accurate as possible in cutting the ribs, and be certain to use "C" stock.

Cut the trailing edge of the center section to the correct length and notch 1/16" at each rib position; next, pin the trailing edge down and cement the ribs in position. The spar can then be cemented in position. If everything is in proper alignment, the spar should fit in without any difficulty. Using 1/4" square hard balsa cut the leading edge to the correct length and cement in position. Allow at least a half hour before removing from the plans. The same procedure is followed through for the other panels until the basic wing structure has been completed; then the sheeting is applied. To insure proper wing alignment, it is best to proceed by sheeting the top surface of the wing so that the wing can again be pinned in position as each panel sheet is being applied. Since the camber is shallow, use a "B" cut that is not too soft and pliable. To insure good joints, it is also advisable to use a slow-drying grade of cement for sheeting. This can be obtained at your local hobby shop. After the upper camber wing sheeting has been applied, remove the wing from the plan and trim off some of the excess cement. Then apply the sheeting to the underside of the wing. To complete the wing, cement the cap strips and balsa tips in position and sand the completed structure to the desired airfoil shape.

Front Wing. The construction of the minor supporting surface is a little different since it has no spar of considerable depth. The procedure is to cut the trailing edge of one panel and notch at each rib location. Pin the trailing edge down on the plans and then cement the ribs in position. A 1/16" square hard balsa stringer is next cemented in position. The 1/8" square hard balsa leading edge is then cut to the correct length and cemented in position. Since there is no spar with the included dihedral angles, it will be necessary to prop up the completed panel, affixing it to the second panel while it is still being constructed. The remaining procedure is the same as outlined previously, with the exception that there are no cap strips to worry about.

Covering and Doping. The original model was covered with orange *Silkspan* on the fuselage, and prewar blue tissue on both wing surfaces. The main reason for doing this was because it was thought the model would be above the required weight. Since the completed model was underweight and required little or no ballast, it would seem logical to cover with *Silkspan* throughout, or even use silk or nylon on the fuselage. In this manner additional weight can be added and ruggedness increased many times. Before proceeding with the covering, dope the framework of the completed model with two thin coats, sanding between each coat. After the model has been covered, apply four to five coats of clear dope. Since it is very unlikely that the model will be overweight, it is not necessary to use the dope sparingly.

Flying. The procedure is the same as it is with any conventional design. Hand-glide the model and observe whether there is a tendency to stall or turn. If the model does have stalling tendencies, place your trim tab on the rear right wing panel, as on the original model. However, should the model have a definite nose-heavy condition (which is very unlikely), place the tab on the front right wing panel. Since the tow hooks are located on the left side of the fuselage, it will be necessary to adjust it for a left turn. Before attempting a tow, adjust the glide for a shallow left turn with a definite nose-high condition. Then with a towline of approximately 30', tow it up using the most forward hook. Should you have to run too fast to get it in the air, use the second hook, or even the third, if necessary. The first hook is best for use on very windy days. After you have the model towing properly, tighten up the turn, which will also have the effect of bringing the nose down. Then if you want that O.O.S. flight, let out a full length towline and watch her go!

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Flapjack

(*Continued from page 23*)

small tube bearing, soldered to the yoke. Wingtip lock and guides are located one on top of the right wing and one on the bottom of the left wing. This wingtip lock consists of two parts. The lock spring is designed to assure that the plane will stay in normal flight position while doing other maneuvers, such as loops, wingovers, etc. It is made of suitable steel wire and acts as a lock for the roll-release pin, thus holding yoke and wingtip as a rigid unit. The wingtip guide and lock is attached to the wingtip by binding with thread and glue.

The release pin consists of two limit-stop washers and a return spring which returns the pin to a satisfactory distance that it will engage wingtip guide and lock when plane rolls to half- or full-roll position.

The roll-trip release pin is operated by the flier by means of a trip line which can be held in one hand or attached to the control handle. This line should have about 3" slack so that wind resistance will not trip the roll-release pin prematurely. The return spring must be of sufficient strength to overcome weight of trip line and wind resistance during flight. I have found that a 2- or 3-pound pull is satisfactory.

You will note that the elevators are independent from the rest of the plane. However, this is not true of full scale planes, but by experiment I have found that this is the most foolproof system of control as far as the flier is concerned. I have also experimented with a system in which the complete plane rolled as one complete unit; this system proved to be more complicated and had the disadvantage of no horizontal control during a fourth roll, meaning when wings were perpendicular to the ground (tip to tip), and also when the plane was in the inverted, or half-roll, position the controls had to be operated in reverse direction. This condition would usually end in confusion to the flier. On the system illustrated, the flier has complete up and down control of his plane during 360° of roll, and also, the controls do not reverse direction when model is in the inverted or half-roll position.

It will be seen that I have illustrated an automatic aileron movement in my drawing. This system does not necessarily have to be used, but it offers the advantage that you can execute all other stunt maneuvers plus a roll in the same flight. Otherwise, the plane must be flown first for normal stunt maneuvers; then after landing, the ailerons must be adjusted properly, after which only the roll maneuvers can be completed, because the plane would not be capable of doing a loop if the ailerons were left permanently in operating position.

The ailerons operate when the roll-trip pin is pulled and passes clear of aileron-operating rod arm which is located just inside of wingtip lock and guide. After the release pin is pulled, this allows the aileron-operating spring to move the right aileron down, and, through the reversing link, moves the left aileron up. This causes the model to roll outward. If release pin is returned to normal position by flier immediately after tripping, it will engage in wingtip guide and lock on left wing, and will also return ailerons to neutral again. Then, if model is tripped again, it will return back to normal flight position. Line tension cannot be produced by offset rudder or out-thrust due to position of model in half-roll position. You will note that line tension tabs are mounted on yoke frame which is independent of the rest of model. This will produce sufficient line tension for all maneuvers, both when model is locked in normal flight position, and during roll.

The horizontal control is transmitted by the pilot from the standard control handle. Control wires are attached to two steel wires leading from yoke tip to center. The lead out wires are threaded through small brass tube guides along the yoke, and the ends of these wires are attached to the elevator bellcrank or double elevator horn. The bellcrank pivots on the yoke frame or elevator mount. The bellcrank is attached to the left elevator and is connected to the right elevator by a connecting bracket. Both bellcrank and connection bracket are made of sturdy 3/64" 24ST aluminum sheet.

There are two forces acting on the fuel in the tank. One is gravity which tends to keep fuel at the bottom of the tank, and the other is centrifugal force which is caused by the plane flying in a small, constantly circular path.

This latter force causes the fuel to swing toward the outside of the flight path, hence toward the outside of the tank. To overcome this problem, first mount the fuel tank centrally in line behind the carburetor. This allows fuel to be at a constant distance from carburetor during a roll. The carburetor inlet line inside the tank consists of a length of flexible neoprene tubing, on the end of which is attached a weight as illustrated. The balloon tank, or Walker pressure system, also works very well. The pressure system is preferred but requires a little more work to fit it into the ship.

For flying, use about 50' of line and a large enough diameter wire to prevent twisting easily, say about .014" diameter.

Make a few straight test flights in order to get the feel of the controls and find the correct engine operation setting. Adjust line tension tabs to give a steady pull around the full circle of flight. It is best to make your first roll with the ship held at about 6' high, and in level flight. Begin your roll slightly before reaching full downwind flight, if there is a strong breeze. Then hold plane steady and before you know it, you are in inverted flight position without a change of control direction. Practice half-rolls first, then follow up with full-rolls. Be sure ailerons are operating correctly and then continue to practice wingovers, loops, etc. You can fly the ship on one side until you are tired, then trip it, do a half-roll, and continue on the other side until well done., Understand? Just like a *Flapjack!*

World War I

(Continued from page 32)

range from 36 mph to 92 mph. At that time this performance was considered phenomenal, and the impact of the *Tabloid* on aviation design was literally heard around the world.

The *Tabloid* was so close to the accepted line of airplane designs of that day that it still incorporated wing warping for lateral control! The little machine was still flying in its original form late in 1913, but by the time a year had passed and the war had begun, it had acquired ailerons, instead.

But the point is, the *Tabloid* set the style for pursuit planes for the next 25 years. The payoff, however, was this: the *Tabloid* was a side-by-side two seater!

There were quite a few *Tabloid* types in existence when World War I began, and during 1915, these served admirably with the British Army as scouts. Of course, when the Germans gained the advantage through the synchronized machine gun, they were outclassed, and the quest began for a new plane that could carry a machine gun and still do the job of the *Tabloid*, as regards speed.

Late in 1915, when the Fokker scourge really got serious, the Britsh Sopwith Aviation Company, Ltd., already had an improved Tabloid on the drawing boards which they called the *Pup*.

Progress in aircraft design had made rapid strides. Sopwith already had built the famous 1½ *Strutter*, a two place biplane. The *Pup* was a small edition of the *Strutter*, based on the fabulous Tabloid as to size.

PUP DESIGN. Dimensionally, the two ships compared as follows:

	Tabloid	*Pup*
Length over-all	20'4"	19'4"
Wingspan (both)	25'6"	26'6"
Wing area, sq. ft.	241.3	254
Wing chord	5'1-1/2"	5'1-1/2"

And their weights were very similar:

Weight empty, lbs. (80 hp)	730	787
Weight loaded, lbs. (80 hp)	1,120	1,225
Fuel, lbs. (80 hp)	245	178
Military load, lbs.	—	80

The original *Pup* flew about the first of January, 1916. The exact date is lost to history, but we do know that the Sopwith experimental department put its sign of approval on the *Pup* February 9, 1916. In any event, the *Pup* was a completely new design, built specifically to carry a synchronized machine gun firing through the propeller arc, and to even up the odds which the Fokker monoplane had held for months. In quick succession came Bristol and Martinsyde scouts. Already at the Front banging away at the Fokkers were the DH-2 and F.E.8 single-seat pushers, but it was the Sopwith *Pup* that carried the brunt of the Fokker scourge.

The *Pup* was an unusually simple airplane. It was a straightforward design in which everything not related to a fighting airplane was left off.

The basic fuselage outlines formed an almost horizontal line on the upper surface, with a swept up lower surface. The cross section in front was nearly square, and the roundness of the rotary engine cowl was carried aft by side stringers which extended back to the cockpit and by a stringer-rounded upper deck. The pilot sat just behind the center of gravity with his head below the level of the upper wing. This gave him a poor view forward and upward, but on many models either a portion of the center section was left uncovered, or it was covered by transparent celluloid sheeting.

The original Sopwith *Pup* engine was the 80 hp Le Rhone. Many models were fitted with a 100 hp Gnome *Monosoupape*. Both engines were neatly cowled in with a quickly removable aluminum cowl into which exhaust slots had been cut.

Earliest models of the *Pup* were fitted with a fixed horizontal stabilizer. In this event, the horizontal stabilizer was braced directly to the vertical fin with the rear wire attached to the rear or main vertical fin spar. Later, the tail plane was made adjustable and was "hinged" on its front spar. The rearmost wire brace, in this case, was attached to a threaded collar within the vertical fin, which permitted the wire to remain tight as the collar was raised up or down during rotation of the steel tube to which the collar was threaded. The adjustable tail plane models were easily identified by the vertical slot in the fin which permitted the rear tail plane bracing wire to travel up and down.

Generally speaking, all *Pups* in use with Front Line squadrons were converted to the adjustable tail plane type.

Armament on Front Line squadron types consisted of a single-synchronized Vickers gun. Certain models, used for home defense squadrons stationed in England early in 1916 were fitted, instead, with a single Lewis mounted in a rectangular hole cut out of the center section. The idea was that the *Pup* could fly underneath the enemy and let him have it. These tactics were used by *Pups* which were sent up to knock down Zeppelins which raided England early in the war. Other models used in training were fitted with camera-guns mounted on the right of the curved upper deck.

Maneuverability was designed into the *Pup* by use of large movable control surfaces. Ailerons were fitted to both wings, and the rudder and elevators were enormous. Wing loading of the *Pup* put it in the glider class—the 80 hp model carried only 4.8 lbs./sq./ft. It was, of course, a very buoyant airplane, and could almost hover in the air. It actually landed at only 30 mph and probably reached a full stall at even less speed than that.

If the Sopwith *Pup* sounds like a pretty good airplane, even in its day, you can imagine how elated British pilots were to have it available in the Spring of 1916. Total production of the *Pup* reached 1,806 ships, so you can see it was well regarded.

How this little fighter was constructed will be told in a future issue of MODEL AIRPLANE NEWS, together with something of its flying characteristics, and details of its performance.

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P-1 North American Mustang	24"
P-2 Douglas A-26	30"
P-3 Republic Thunderbolt	24"
P-4 Grumman Hellcat F6F	24"
P-5 Lockheed Lightning P 38	34"
P-6 Clipper, Jr.	36"
P-7 Pepper	32"
P-8 Taylorcraft Wingspan	54"
P-9 Aeronca "K" Wingspan	54"
P-10 Piper Super Cruiser	40"
P-11 Gull	42"

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1/16x1/8	1c	1/4x3/8	4c
1/16x3/16	1½c	1/4x1/2	6c
1/16x1/4	2c	1/4x5/8	7c
1/16x3/8	2½c	1/4x3/4	8c
1/16x1/2	3c	5/16 sq.	5c
3/32 sq.	1c	3/8 sq.	6c
3/32x3/16	2c	3/8x1/2	8c
3/32x1/4	2½c	1/2 sq.	9c
3/32x3/8	3c	3/4 sq.	15c
3/32x1/2	3½c		
1/8 sq. 3 for	5c		
1/8x1/4	2½c		
1/8x3/8	3c		
1/8x1/2	4c		
5/32 sq.	1½c		
3/16 sq.	2c		
3/16x1/4	3c		
3/16x3/8	3½c		
3/16x1/2	5c		

SHEETS

1/64x2	8c
1/32x2	8c
1/20x2	8c
1/16x2	8c
3/32x2	10c
1/8x2	10c
5/32x2	12c
3/16x2	14c
1/4x2	16c
5/16x2	18c
3/8x2	20c
1/2x2	22c
1/32x3	13c
1/16x3	13c
3/32x3	16c
1/8x3	16c
3/16x3	22c
1/4x3	25c
3/8x3	31c
1/2x3	34c

PLANKS

1x3	$ .55
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2x3	1.25
2x4	1.60
3x3	1.50
3x6	3.00
4x4	3.50
4x6	4.25

Beveled balsa trailing edges, 36" lengths

3/32x3/8	3c	5/32x5/8	5c	7/32x3/8	7c
1/8x1/2	4c	3/16x3/4	6c	1/4x1	8c

Propeller Blocks

8x7/8x1-3/16	6c	1-3/4	24c
10x1x1-1/2	10c	9x1-1/2x2	15c
12x1x1-1/2	12c	10x1¾x2	20c
14x1-3/16x1-3/4	18c	16x1-1/2x2	28c

18x1-3/4x2 32c

Glider Wing Section
3x3/16x20 18c

Comet tube cement 10c & 25c
Tester A or B cement 10c & 25c
Clear Dope 1 oz. 10c 2 oz. 20c 8 oz. 50c
Thinner 1 oz. 10c, 2 oz. 20c, 8 oz. 50c
Colored Dope 1 oz. 10c, 2 oz. 20c, 8 oz. 65c
Red, Orange, Yellow, Green, Lt. Blue, Metallic Red, Metallic Blue, Black, White, Silver, Olive Drab
Music wire 3 ft. .020 & .030, 3c; .039 & .040, 4c; 1 16, 5c; 3 32, 10c; 1 8, 15c
Silkspan, White 99c, 5c sheets; GM, 10c; 3 for 25c
Jap Tissue, Red, Yellow, Blue 2 for 15c
G-M Tissue, White, Red, Yellow, Blue 10c, 3 for 25c
T-38 rubber, per ft. 1 32, 1 16, 3 32, 1 8, 1c; 3 16, 1½c; 1 4, 2c
Aluminum tubing, per ft. 1 16, 3 32, 10c; 1 8, 12c; 3 16, 15c; 1 4, 18c
Brass tubing, per ft. 1 16, 12c; 3 32, 14c; 1 8, 16c; 3 16, 20c; 1 4, 24c
Plywood sheets 6x12: 1/16; 3/32; 1/8; 3/16; 1/4 30c
Cellulose acetate sheets .005, 10c; .010, 20c; .020, 30c
Tester carved balsa propellers 10c & 25c
12", 14" & 16" dia. 50c ea.
Jasco rubber lube 1 oz. 15c
Jasco Micro-film Solution 1 oz. 17c
Prop hook small 5c; med. 5c; large 5c
Large face bushings 3 8"; 7 8", eyelet 1 10x3 16, 5c
Propellier hinges 20c set
Tensioner springs 5c
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Air Ways

(*Continued from page 29*)

class at the Australian National Championships this year. The plane is powered by an *E. D. Competition Special* diesel, and scored its victory despite the fact that it had a badly damaged fuselage. Note the sticks and string wrapped around just ahead of the tail surfaces.

The next photograph, No. 2, was sent us by Ben White (Manchester, Kentucky) who states that there are very few model builders in his section of the mountains. The photo shows Roy Phillips, also of Manchester, with three of his successful flying models.

The very unusual engine depicted in our third illustration is of the expansion type and was made by A. Kocagoz (Soke, Turkey). The engine works on either steam or air pressure and has a single ball valve. The bore and stroke are 12 and 14 mm. and it has been found to operate at 1,500 rpm with a good size propeller.

Mr. R. W. Miller (Richmond Heights, Missouri) is a confirmed free flight enthusiast and one of his many successful models is seen in picture four. The pusher has a 48" span, 334 sq. in. of area, and weighs 21 oz. An *Arden .099* engine supplies the power. Although not apparent in the picture, the wing has a 25° sweepback, and the ship has been found exceedingly stable under all conditions. The fuselage and tail boom are entirely of sheet balsa construction; the booms are made a "T" shape in cross section, with paper sides to give them a triangular appearance.

The ambitious scale model in our next snapshot is a 7' Stinson *Reliant* built from a Cleveland kit and powered by a Burgess five-cylinder radial engine. The ship is colored red and silver with black trim, and its builder William Oeder (Box 91, Hartland, Wisconsin) states that it floats very well but he gives no other details of performance. Bill, incidentally, is a member of the *Waukesha Gas Bugs*.

Picture No. 6 shows a slick speedster, the work of Les McBrayer (1739½ East Ramona Boulevard, Rosemead, California) who has named it the *Highlander*. Les designed this ship as a team racer, but the fine trophy beside it was awarded for first place in Proto Speed at a recent Salinas, California, contest. On its winning flight, the model averaged 87.98 mph for 1-1/2 miles from a standing start. Wingspan and over-all length are both 28", while the model weighs 29 oz. and is powered by a *K & B Torpedo 29*.

A dazzlingly decorated free flight model airplane appears in our seventh illustration. Stephen Ditta (73 First Avenue, New York 3, New York) who constructed this Class A, job notes that the photograph was the work of Paul Muller. The model has a *McCoy 19* glow plug engine, and Mr. Ditta notes that it is just one of his "pencil bombers." The plane is entirely silk-covered, and the pattern is in black. During flying tests the ship was lost out of sight after a 13-second motor run, and Mr. Ditta writes that he is hoping for its return in time for future meets this season. A second ship of the same design is now being built and will carry a *Fox 59* engine.

The very neat solid scale ship in the picture No. 8 was built by Joe Broun (106 East Gano, Kokomo, Indiana) while he was in the Navy stationed at Moffett Field. The plans for the model were taken from the big plane which was undergoing NACA tests at that time. Mr. Broun is a member of the *Kokomo YMCA Flying Wildcats*.

Something really unusual in CO2-powered scale models appears in picture No. 9. This is an ancient Bleriot monoplane by Howard Ricketts (5607 Kenwood Avenue, Chicago 37, Illinois) and was built to exactly twice the size of Bill Wylam's scale plans of this airplane which appeared in a past issue of M. A. N. The *Campus A-100* engine cylinder was found to be in exact scale to the center cylinder of the original three-cylinder engine on the Bleriot; two dummy cylinders were added to further the illusion. The wingspan is just about 15", and the landing gear has working shock absorbers just as on the original. The wheels are built up, utilizing balsa rims and bamboo spokes and the landing gear is also bamboo for added strength. The only real change made from the original plans was to enlargen the stabilizer somewhat. Mr. Ricketts notes that when this picture was taken, the ship had not been flown due to poor weather, but has exhibited fine gliding characteristics and the engine should have plenty of power for this job. A larger propeller will be used for actual flying.

Photo No. 10 shows an original PAA-Load design by Bob Higgins (705 State Street, Pullman, Washington). The plane weighs 31 oz., without the two pilots, and is powered by a K & B *Glow Torque 29*. The pilots are made of pine and weighted with plumber's lead.

An attractive speed model is shown in our next illustration and looks quite a bit like standard American "hot job," but was built by Mr. Cyril Shaw, of the English *Zombie Club*. A Glow Plug *McCoy 29* supplies the power. This photo was sent us by K. G. Miller (Eight Hurst View Road, South Croydon, Surrey, England).

Another English model, this time a beautiful scale copy of the Avro 504K, appears in our last photograph. This airplane was built by Ray Booth, and the photo was submitted by Charles Newcomb (Route 15, Box 289, Middle River 20, Maryland). The model is a free flight job, powered by an *Amco .87* cc. diesel and is a very fine flier, having won several trophies in its class. It takes off very nicely under its own power and durations up to 4 mins. have been obtained. The wingspan is 3' and balsa and tissue construction are employed. The wings are of the knock-off type, held on by rubber bands which take the place of interplane wires.

This concludes the picture show for this month, but don't forget, you model builders, that we are awarding a free one-year subscription to every modeler whose picture is used in this column. Dig out your prize models and your cameras, and let the other readers see what *your* pride and joy looks like!

NEWS OF MODELERS

PEN-PAL SEEKERS: Robin Dispain, 69 Mackie Road, Filton, Bristol, Gloucestershire, England, age 17, is interested in controliners . . . I. Dahlberg, Box 162, Skara, Sweden, age 19, prefers to design and build model gas engines and would like to correspond with someone with similar interests . . . Ernst Schalk, Prieros Kr. Beeskow, Seekorso 126, Post Kgs. Wusterhausen, Ostzone, Germany, is eager to exchange letters about building and flying models controlled by radio . . . John Hall, Four Cannon St. North, Walsall, Staffs, England . . . Yoshiro Fukunaga, 2272 Shimo Shimizu Cho, Yamaguchi, P. O. Zone Yamaguchi-ken, Japan, age 19, likes everything about model airplanes, but is chiefly interested in PAA-Load right now . . . Norman E. Wyman, 512 Main Street, Leominster, Massachusetts, would like to correspond with a fellow in Germany who is about his own age, 18 . . . Antonio J. Ruiz, Sta Clara No. 205, CFGS, L. V. Cuba.

EXCHANGE MOTORS: Stafford Screen, Woodlands, Powke Lane, Blackheath, Birmingham, England, has an *Elfin* 1.8 cc. and an *E. D. BEE* 1 cc. diesel in perfect running condition, either of which he would like to exchange for an *Ohlsson 19* or *23* with rotary valve and glow plug, or an *Arden 199* glow plug only.

SPECIAL REQUEST: H. R. Perry, Jr., 23 Lloyd Court, Brooklyn 23, New York, writes that he has copies of M. A. N. from 1940-1947 that he no longer needs. Modelers who may be able to use these magazines should write him promptly.

CLUB NEWS

California

Here are the High Point Winners for the 1949 Team Racing Contest Season: Lawrence Williams—784 pts.; Bud Hartranft—707; Granger Williams—637; Keith Storey—554; Rudy Panko—485; Jerry Gaston—264; H. M. Bourgeois—255; and Cliff Potts—256.

The following were winners of the Team

(*Turn to page 42*)

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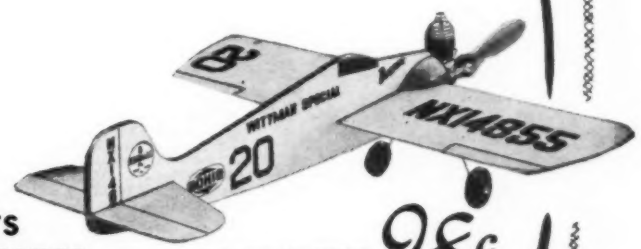

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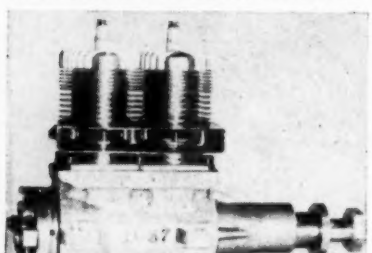

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Races held at Santa Anita, April 16. *Ten-Mile Event (Main)*—Keith Storey; *Five-Mile Consolation*—Willie Tolin; *Beauty*—Lowell Lynn; and *Trophy Dash*—Bud Hartranft.

More results; this time of the *Medford Prop Nuts'* Speed and Stunt Meet, held April 16. *Class A Speed*—Ray Edwards 95 mph; *Class C-D Speed*—Ray Edwards 124.95; *Stunt*—Clarence Young 974 pts.

And still more **results!** The first Annual Trophy Contests of the *Northern California Free Flight Council*, held April 23, at Sacramento was one of the largest and most harmonious contests ever held in that area. Of the 122 entries, 49 were in the ½A category. All the affiliated clubs of the *N. C. F. F. C.*—the *Sacramento Skyoneers, Oakland Cloud Dusters, San Francisco Vultures, The Aeroneers, Stockton Gas Model Association, Elmhurst Prop Busters*, and the *Alameda Prop Spinners*—were on the field doing their share of work. Tom Moore, Mario Bertolucci, June Dyer, Ann Rutter, John Lenderman, Hal Simmons, L. D. Tupper, and Lee Ross really did a very good job in making the contest a success. The happy winners were: *Class ½A Open*—Ralph Maki 8:08.5; *Jr.*—Doug Smith 7:49.2; *Class A Open*—R. E. Willis 9:03.6; *Jr.*—Jack Ritner 7:55; *Class B Open*—A. J. Oliver 13:43; *Jr.*—Gary King 8:22.8; *Class C Open*—Mario Bertolucci 12:00; *Jr.*—Laddie Lloyd 4:49.4; and *High Time of the Day Trophy* awarded to A. J. Oliver.

Jack Ritner, of the *San Francisco Pterodactyls Club*, was high point man in the 7th Annual Spring Glider Contest, and as a result of his fine performance, he has added another trophy to his growing collection.

Maine

The Gardiner Board of Trade recently donated a flying field to the *Gardiner Flying Tigers;* this should make the fellows really happy and active.

Maryland

Another election of officers was held by the *Dundalk Model Airplane Club;* the reason was to give the younger members an opportunity to run the club and let the old officers have a chance to catch up on their model building. Although there are a few senior member officials, the club is really trying to bring out the juniors. Don Seeley is the new president; Dan Wieczynski, vice president; Vernon Jung, treasurer; John Dohner, secretary (John sent in this news item); Fred Blakus, Sgt.-at-Arms; Clarence Smith; Zee Witmyer, field director.

New York

Another membership drive is underway. The *New York Aeronuts* (they hold the CO2 record, and several indoor records) want boys—16 years old and over. Those wishing to join should contact Stan Barbakoff, 39 Scholes Street, Brooklyn 6, New York.

An invitation is extended by *The Flying Bisons* to visit their club room in the Humbolt YMCA on East Ferry Street, or during the summer season at their flying field at Young Road and Wherle Drive, Williamsville, any Friday evening.

Texas

Brother Stanley, CSC, faculty advisor at the St. Edward's University High School, of Austin, a boarding school for boys, tells us that the boys have recently organized a *Model Plane Club*. They even have a Hobby Shop in which the planes are modeled and built and the motors are put through their paces. Test runs are exciting affairs and the entire student body gathers after school to watch the so-called "Best Planes in the State" take off. Their chief interest at present is in controliners, and in the very near future they plane to build equipment for radio controlled planes.

Australia

We have recently received the results of the 1950 Australian Nationals, and here they are: *Hurl Glider*—W. R. Reeve 56.5 secs.; *F. A. I. Sailplanes*—W. Malcolm 232 secs. av.; *Junior Rubber*—J. McGrane 218.1 secs. av.; *Precision Payload*—A. Tinker; *3.5 cc. and Under*—R. Moodie 9.30 ratio; *Over 5 cc.*—R. Harwood 11.43 ratio; *F. A. I. Rubber*—J. Fullarton 200 secs. av.: *Anthony Hordern Trophy*—A. Lim Joon 163.5 secs. av.; *Indoor Stick*—G. Burford 639.5 secs.; *Indoor Fuselage*—B. Felstead 422.8 secs.; *Australian Wakefield Trophy*—A. Meader (R. Rowe, proxy) 274.1 secs. av.; *Open Stunt*—R. Copper 285 pts.; *Junior Stunt*—J. Lamont 259 pts.; SPEED EVENTS. *Diesel A*—R. Jowett 59 mph; *Diesel B*—J. Brown 79.9; *Open A*—L. Cantwell 94.6; *Open B*—N. Bell 106.4; *Open C*—N. Bell 97.7; *Open D*—J. Connell 93.7; *Team Speed*—C. Wheatley; and *Flying Scale*—A. Williams. Our thanks to Jim Fullarton for sending us this information.

England

This year's "Model Engineer Exhibition" will be held at the New Horticultural Hall, Westminster, August 9 to 19, inclusive, and will be open to the public from 11 a.m. to 9 p.m. each weekday. It is their twenty-fifth anniversary, and they hope to have a very good display. The first twin-engined radio controlled aircraft in the world to fly will also be on view. Further information may be obtained by writing to Mr. E. D. Stogdon, Exhibition Manager, Percival Marshall & Company, Ltd., 23 Great Queen Street, London, W. C. 2, England.

COMING CONTESTS

July 9, N. C.—Winston-Salem, Free Flight Meet; CD—Loyd Hathaway, City Recreation Dept., Winston-Salem.

July 9, PA.—Pittsburgh, Class AA, *Pittsburgh Model Airplane Control-Liners'* Contest, U—Sp, St., S. CD—L. Stoutenburg, Jr., 21 So. Emily St., Pittsburgh 5.

July 9, ILL.—Rock Island, *Illinois-Iowa Aeronautical Association's* 5th Annual Air Derby (25-mile endurance race for U models).

July 9, OHIO—Akron, Plymouth Elimination Contest, Chamberlain Model Airport, *Rubber City Aeronauts, Inc.;* CD—Lloyd Wellner, 582 Blanche St., Akron 7.

July 9, OHIO—Cleveland, Jr. National Air Races; CD—Charles Tracy, Aviation Editor of *Cleveland Press*, Cleveland.

July 9, OHIO—Akron, Class A, *Akron Society of Model Plane Engineers'* Contest for rubber powered models; CD—Frances Alexander, 25 Mull Ave., Akron.

July 16, N.Y.—Watertown, Class AA, 6th Annual Northern N.Y. Model Airplane Meet, all classes of F, U, Precision, S, R, G; CD—William Tracey, 270 Mullin St., Watertown.

July 16, IOWA—Burlington, Tri-State Model Airplane Meet, sponsored by Dail Motors, Inc.

July 16, ILL.—Moline, *Illinois-Iowa Aeronautical Association*, closed U meet.

July 22 & 23, MONT.—Helena, 2nd Annual Montana Plymouth Dealer's Contest; CD—Bob Carroll, Box 1000, Anaconda.

July 23, IOWA—Cedar Rapids, Model Airplane Contest, held at Municipal Airport.

July 23, FINLAND—Wakefield Finals.

July 25 to 30, TEXAS—Dallas, Class AAAA, 19th Nationals; CD—John Clemens, 2114 Greenville Ave., Dallas.

July 30, CALIF.—Fresno, *Fresno Gas Model Airplane Club* Record Trails for F; CD—Ocie Randall, 716 Waterman Ave., Fresno.

July 30, ILL.—Decatur, 2nd Annual Plymouth Dealer's Contest, Classes A, B, C, and D, St, Sp, S; info: 2700 West Main St., Decatur.

Aug. 6, ILL.—Alton, *Alton Model Airplane Club*, 1st Annual Invitational Contest, all Open, Classes A, B, C, and D St, Sp.

Aug. 6, PA.—Pittsburgh, Class AA, *Pittsburgh Model Airplane Control-Liners'* Contest, U for TR; CD—same as July 9.

Aug. 6, MICH.—Royal Oak, Class AA, *Royal Oak Cloudbuster's* 3rd Annual Meet for U Sp, Precision, S; CD—John Kates, 604 So. Edison Ave., Royal Oak.

Aug. 6, MONT.—Billings, Class AA, 1st Annual FF Flying Circus; CD—Bob Carroll, Box 1000, Anaconda.

Aug. 6, OHIO—Cleveland, Class AA, 3rd Annual CO2 Meet; CD—John Grega, 10422 Gay Ave., Cleveland.

Aug. 13, IOWA—Clinton, *Illinois-Iowa Aeronautical Association*, U, all classes.

Aug. 13, OREGON—Salem, *Salem Model Airplane Club*, F; info: 2080 Market St., Salem.

Aug. 13, N.Y.—Schenectady, Class A, Harold Bradish R. O. W. Free Flight Gas Contest; restricted to members of *Schenectady Aeroneers;* CD—Dale Springsted, 837 Eastern Ave., Schenectady.

Aug. 13, MONT.—Great Falls, Class AA, 4th Annual U Flying Circus; CD—Bob Carroll, Box 1000, Anaconda.

Aug. 14 to 21, MICH.—Detroit, Class AAAA, International Ltd. 4th International Model Plane Contest, T, all F, all U Sp, Precision, S, TR; CD—Warren Bartlett, P. O. Box 3118, Detroit 31.

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TABLE OF CONTENTS

Introduction by Walt Schrader
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Aug. 27, PA.—Pittsburgh, Class AA, *Pittsburgh Model Airplane Control-Liners'* Contest, Sp, St, S; CD—same as July 9.
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Sept. 3, IOWA—Waterloo, Class AAA, *Waterloo Prop Twisters' Meet;* CD's: Kenneth Satterlee and E. Fletcher, 1146 West 12th St., Waterloo.
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Sept. 4, N.J.—Far Hills, 3rd Annual Lions Club Controline Meet.

U—Controline; F—Free Flight Gas; R—Free Flight rubber; G—Glider; RC—Radio Control; W—Water Events (ROW); S—Scale; I—Indoor; T—Towline; PAA—PAA-Load; Sp—Speed; St—Stunt; TR—Team Racing; J—Jet Speed; HL—Hand launched; Class—shows size of meet and signifies AMA sanction; AMA—Academy sanctioned.

Design Forum

(Continued from page 27)

is the slip. To determine the theoretical pitch of the rearward propeller, the slip of the forward propeller must be added to the theoretical pitch of the forward propeller. This gives you the theoretical pitch of Propeller Two, and is shown in the Fig. 2 as P_2. The angle formed between the line from A to P_1 and the line from A to O is the angle of the blade at the tip. Line AO is equal to 3.1416 times the propeller diameter, the circumference of the circle prescribed by the propeller tip. This is the distance the tip travels sideways in one revolution. During flight, however, the propeller also moves forward. *If there is no slip*, the blade at the tip will travel *sideways* and *forward with the cord of the blade parallel to the line of motion*. The tip will follow the path AP_1. In one revolution, therefore, it will move *forward* the distance OP_1. However, due to unavoidable slip, it will not actually travel along AP_1, but instead will follow path AP_{A1}. So the actual pitch or forward distance travel is OP_{A1}. Now you may ask why the rearward propeller must have a theoretical pitch of OP_2. When the forward propeller revolves and slips, air to the rear of its rotating blades moves rearward with velocity equivalent to the slip. That is, this air moves rearward a distance of P_1P_{A1} in one revolution of the propeller. Consequently, when this rearwardly moving air reaches Propeller Two, Propeller Two must react on this air which is already moving at greater velocity. Consequently, it must have more pitch in order to produce the same thrust as the forward propeller. In fact, the pitch must be increased an amount that will overcome or compensate for the rearward motion of the air from the forward propeller. This means that the pitch must be OP_2, which is equal to the theoretical pitch of propeller P_1, plus the slip of propeller P_1.

Usually the slip is equal to one third of the theoretical pitch on commonly-used propellers, where the pitch is between 6 and 8". This means that the theoretical pitch of Propeller Two must be 33% greater than that of Propeller One, or that the blade angle of Propeller Two must be 1/3 more. If the counter rotating propellers are designed to this pitch and blade angle relationship, they will operate with maximum efficiency under any given condition of plane design when rotating at equal speeds but in opposite directions.

On the other hand, if you wish to use propellers of *equal pitch*, you may do so, provided the rearward propeller is rotated one-third *faster* than the forward propeller. This one-third value is approximate. If you wish to figure the exact relationship, you must determine the exact amount of slip and lay out the blade angle of your pro-

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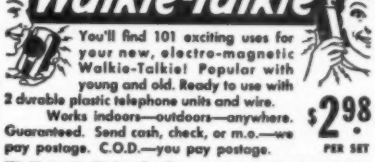

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peller according to its diameter, as shown in Fig. 2. The line AP_{A1} should be at an angle of 3° to line AP_1 to insure maximum blade efficiency. Lay the lines out in this manner; then determine the slip as indicated by the distance between P_1 and P_{A1}.

Mr. Bohi has another question which will interest canard builders. He asks, "How large should the forward stabilizer be if the center of gravity of the airplane is at the 25% line of the main wing chord?" We do not know why he wishes an answer to this question because it is merely a waste of time to build an airplane with conditions where the C.G. is at the 25% point of the main wing chord. For correct results, the forward stabilizer would have to be microscopic in size and the plane would be very critical in respect to longitudinal stability. In a canard, the center of gravity should never lie within the chord of the main wing. For best efficiency, the C.G. should be located ahead of the main wing a distance at least equal to the chord of the wing; that is, the center of gravity should be forward of the leading edge a distance equal to the wing chord.

An excellent rule is to divide the distance between the centers of the two wings into five parts and place the center of gravity so it is four parts rearward of the front wing and one part forward of the rear wing center. This is a primary condition for good stability in canards; other setups will be less stable. Many builders try to modify this setup when they design gas-powered canards because it is difficult to build these planes with a structural arrangement that will have the center of gravity in this position. Rather than waste your time following structural convenience, it is far better to arrange your power units, etc., so the *center of gravity falls in the right position;* then you will be assured of satisfactory flights. In the case of gas canards this is difficult. Nevertheless, the motor should be placed forward far enough to locate the center of gravity properly. An extension shaft to a propeller at the rear will solve this problem.

Renny Higgins, of 231 Montgomery Street, Troy, Alabama, wants to know the proper setup for low-wing planes. This has been discussed in previous *"Design Forums"* but is sufficiently important to repeat.

Contrary to common belief, low-wing planes can be made to fly just as well as parasol or high-wing models; it depends entirely upon how the wings and tail are set in relation to the thrust line. In fact, if you wish a model that has little tendency to stall during power flight, combined with a tendency to nose upward during glide, a low wing is the model to build. Look at Fig. 3; you will note the thrust line T is above the line of resistance R of the airplane. The point of arrow R is at the center of resistance CR. This is the point at which the resultant of all the resisting forces act. During power flight, the propeller pulls forward and the resistance pulls backward. If these two forces react on the same line, the model will move forward without tendency to nose either upward or downward. However, when the arrow R is *below* arrow T, as shown here, a rotational couple or moment is created which tends to nose the plane *downward*. When power stops and glide begins, this nosing-down couple ceases.

Now in order to balance the nosing-down couple during climb, the stabilizer must be set at a negative angle to the thrust line so a downward force S on the stabilizer is created to counteract the nosing-over effect of T and R. S tends to push the tail down and nose the plane upward. Both these forces react and are balanced under power. To climb properly, the effect of S must be slightly greater than the nosing-over couple in order to nose-up the plane during climb. Usually a negative angle of 1-1/2 to 2° on the stabilizer is sufficient. In such a case the main wing should be set at zero degree or parallel with the thrust line.

When the engine cuts and the model starts to glide, the nosing-down couple ceases and the nosing-up couple, due to S, diminishes (because of lower flying speed) but does not cease entirely. The couple of S is proportional to the square of the speed. If the speed during glide drops to one half the climbing speed, the couple S will drop during glide to one fourth of its value during climb. However, this one fourth pushes down the tail sufficiently to nose up the plane considerably during glide so that it normally will assume the large angle-of-attack required for minimum sinking velocity—an angle which is not great enough to cause stalling.

On the other hand, the model may be made to nose-up even more sharply during glide, with any given power-on trim for climb, if the stabilizer is set at zero degree, parallel to the thrust line, and the wing is set at plus 1-1/2 to 2°. This creates greater difference between power-on and power-off trim, causing the model to nose-up more during glide. The reason is obvious; the nose is held down during climb, with any given setting of wing relative to the center of gravity. Then when the power ceases the nosing-down couple is eliminated and during glide, therefore, the model has a tendency to nose upward. Usually in this kind of setup, the main wing must be placed so the center of gravity is about 60% of the chord rearward of the leading edge, as shown by the dotted arrow W.

When low-wing models have wings and stabilizers set at similar angles to high-wing models they have been known to fly level under power and actually stall when power ceases. We recommend the setup shown in Fig. 3 wherever the line of thrust is *considerably above* the center of the wing as shown. However, when the center line of the wing is only *slightly below* the line of thrust, the stabilizer setting should be zero, and the wing 1-1/2° to 2°.

Robert Ohly, of S. Muscatel Avenue, San Gabriel, California, sends us a side view outline of a full scale airplane which he believes to be very advantageous aerodynamically. In many respects we believe he is correct. The center of gravity will be located as indicated, with the engine placed down in the body and the propeller driven by belts. However, the C.G. is very low compared to the side projected areas, when the engine is low. Better results would be obtained if the engine is mounted high on a level with the wing and at the rear. With this arrangement the center of gravity should be about at point $C^1.G^1$. In such a case the C.L.A. also will be higher as indicated at point $C^1.L^1.A^1.$; this will produce an airplane of very much better design.

Though Mr. Ohly placed the tail surfaces correctly to bring the C.L.A. in the position which he shows, he has handicapped himself in doing so because during landings, when the plane is nosed-up to the angle of maximum wing lift (approximately 15°), the tail will hit the ground as indicated by line XY. So we see that the tail should be raised not only to raise the C.L.A. to point $C^1.L^1.A^1.$, but also to allow maximum angle-of-attack for landing. This landing condition is the reason for the upward slope of the tail on many airplanes. Actually the tail should appear approximately as indicated by the dotted lines Fig. 4; this has the added advantage of raising the stabilizer out of the area of wing downwash.

It is not always wise in a large aircraft to put the fin area too low because it produces great resistance to circling. For instance, when the plane is banked, the plane will not naturally circle into the bank but will tend to fly straight and even fight the rudder. It is much wiser to raise the fin area so that turning the rudder will cause the plane to rotate counter to the bank, about the longitudinal axis. If the rudder is turned to the left and is located above this axis, it will have a tendency to rotate the plane to the right but nose it to the left. With the rudder placed as Mr. Ohly has shown, turning it to the left for a left circle is apt to cause rotation to the left and an increase in the bank, because it is below the longitudinal axis or at least not sufficiently above it to prevent this condition. In models, the C.L.A. and the C.G. may be located on a horizontal line. However, in large airplanes they must be located so that proper reaction takes places both with neutral rudder and when the rudder is turned. This will be discussed in detail in some future *"Design Forum"* column.

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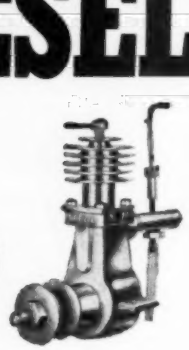

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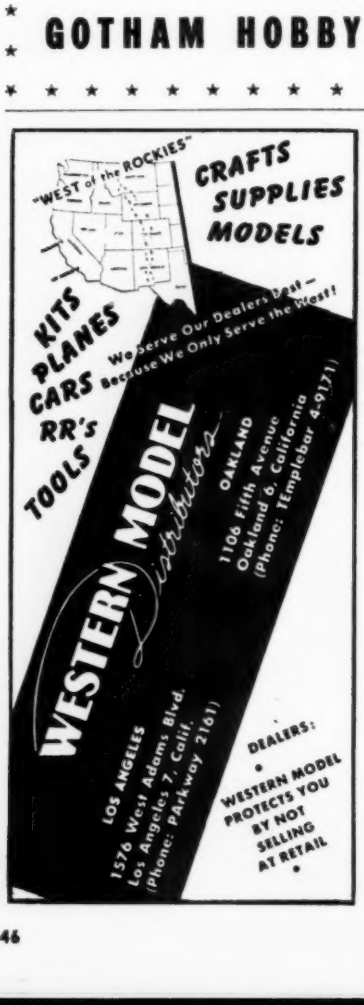

Strictly Solid

(*Continued from page* 13)

around some cylindrical object. Throughout the finishing process this slight concavity between the rib stations should be carefully preserved. The Pitcairn and Ryan models illustrated feature wings sanded and finished in this way. (The Ryan, incidentally, was built directly over plans to a scale of 1/4"=1' which appeared in the February, 1944, MODEL AIRPLANE NEWS.) Similarly, a fabric covered fuselage is characterized either by a flatness or slight concavity between stringers which can be duplicated in a solid model by the same method.

There are a number of simplifications of solid scale detail that have become more or less common but which have little to recommend them. Among these are painted outlines to suggest hinge lines of control surfaces, printed paper cabin or cockpit enclosures glued on models to represent pyrolin, celluloid disks in place of propellers, and printed replicas of radial engines, all of which automatically insure a phoney appearance on any model. As a suggestion, avoid these shortcuts—no detail at all is usually better than unconvincing detail. However, there is no need either to omit this kind of detail or to adopt unrealistic methods. To emphasize the control surfaces simply cut the ailerons, for example, from the completed wing, shape the leading edges to conform to the particular design, and fasten them back in place preferably using small bits of metal or wood to suggest the individual attachment bearings. It may take a number of extra hours to model cabins or cockpits or to represent the engine in three dimensional form but the results will surely repay the effort.

Scale accuracy, color, and texture (the finish—dull or shiny, rough, or smooth) each contribute to authenticity; if the modeler stops at scale accuracy, he may fail to get the realism he expects. Consider for example a radial engine for a small solid model. Here complete scale accuracy is usually out of the question for, with the model built, say, to a scale of 1/4"=1', the engine diameter is likely to be less than 1". Faced with the building of this complex miniature feature, some modelers carve balsa "cylinders" and cement them around the model's nose; others, as mentioned above, resort to drawings or photographs of engines which they affix to the front of the fuselage. In neither case is the result satisfactory. Yet the modeling of a fairly realistic radial engine within a diameter of 1" is not difficult although it will require more time than is usually alloted for such a part. A radial engine first of all should be considered not as simply a collection of cylinders. To list a few other visible parts which contribute to its over-all effect, there are intake manifolds, exhaust manifolds, collector rings, the ignition harness, and the crankcase assembly. Each of these, incidentally, can be built to scale; can be given the correct finish with respect to both color and texture. The cylinders may be carved from wood to approximate shape—use any wood harder than balsa—wrapped with black nylon thread and shellacked. This is admittedly only an approximate representation of finned cylinders but since the entire engine is 1" or so in diameter, an over-all realistic effect can still be obtained provided the other engine parts are accurate in size, finish and location. (On models built to a scale of 3/4"=1' or larger, other and more satisfactory methods may be devised for modeling air-cooled cylinders.)

In the smaller solid scale models, often what is lost from unavoidable scale inaccuracy, can be offset by careful regard to color and finish and by emphasis of the parts which *can* be modeled exactly. A metal propeller is an example in point. A dural or steel propeller cannot be modeled in wood satisfactorily since the proper finish and color is almost impossible to obtain by any of the aluminum paints. However, a miniature metal prop can easily be worked with files and sandpaper from soft aluminum stock. Such a prop can be shaped fairly accurately; equally important, it can be given an authentic finish. Moreover, since it appears in proximity to the engine, it lends its realism to that feature offsetting inaccuracies the miniature engine may have.

The amount of detail on solid scales is entirely up to the builder. For example, the Pitcairn in the accompanying pictures has an operating control system, the linkage being formed from copper wire. (This degree of detail on a solid model of about 8" span is tedious and recommended only for those builders with considerable patience.) On every solid model there will be certain small parts which require exact workmanship and a careful choice of materials. In this connection here are a few time-proven suggestions. For rigging wires try unravelled strands of nylon thread, silver or silver grey in color; for landing lights, glass beads may be suitable; for struts, segments of soft wire flattened and worked to streamline section may prove easier to shape with uniform accuracy, and more realistic than wood. For a neater appearance and better finish, paint the various parts of the model and complete the finish on each part before assembling, and when joining the parts, use small wood pins to minimize the possibility of the cement marring the finish.

The question of the time required to build scale models is worth mentioning since there is a belief that scale models, particularly the solid variety, should require only a few hours of work. A detailed scale model may take up to 1,500 hours; a solid model, if built with some attention to realism, will probably take from 50 to 150 hours. Realistic results simply cannot be obtained in a hurry and, if a model of convincing appearance is the object, on your next solid scale put in some time studying photographs (or better yet the actual airplane) and invest a few extra hours on detail and finish. The results may surprise you.

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Report from the West

(*Continued from page 8*)

placed on them. The ships could have been picked up at the regular station with no trouble at all, but the final resting place closed at noon! Dick and Fudo tracked down about every supervisor in the bay area and finally located Mr. Kaifer around 10:30 p.m., the night before the contest. He consented to go to the station and let the fliers get their ships.

Myrtle "Mom" Robbers gave us the dope on the 2nd Annual Controline Contest sponsored by the *Salinas Stardusters* and the Salinas *Jr. Chamber of Commerce*. This meet was also held on May 7. The famed Salinas Rodeo Grounds was the gathering place for the contestants. This meet was the first of the 1950 *Western Associated Modelers* Sanctioned Contests, and fliers came from all over the West Coast to participate. The *Jr. Chamber of Commerce* and contest director Emery Steinke deserve a "4.0" for the wonderful job they did in keeping the contest rolling.

There were a great many events scheduled at this Salinas meet, so we shall give you the first place winners only. Results: *Precision Class A Expert*—James Freshman; *Advanced*—Norman Wilson; *Beginner*—Eddie McGowan; *Class B Expert*—Ron Kambestad; *Advanced*—H. J. Harvey; *Beginner*—Elbert James; *Class C Expert*—Bob Palmer; *Advanced*—John Morton; *Beginner*—Harry Stoddard; *Class D Expert*—James Freshman; *Advanced*—Bill Rice; *Beginner*—Alvin Kisling; *Class A Speed Expert*—Herm Shiman; *Advanced*—Don De Fries; *Beginner*—Leroy Hollenstain; *Class B Expert*—Herm Shiman; *Advanced*—Kevin Terry; *Beginner*—Norm Brown; *Class C Advanced*—Jerome Guggemos; *Beginner*—Karl Caldwell; *Class D Expert*—Bill Wisniewski; *Advanced*—Erick Moline; *Beginner*—Leroy Hollenstain; *Proto Speed Class A*—R. W. McReynolds; *Class B*—M. L. Gagnon; *Class C*—Herm Shiman; *Class D*—Jerome Guggemos; *Precision Class ABCD Women*—Bernice Jaynes; *Precision Class ABCD Novice*—Eddie King, Jr.; *Exhibition Scale Class ABCD*—Warren Spurgeon—*Flying Scale Class AB*—Robert Warner; *Flying Scale Class CD*—Bill Rice; *Jet Speed*—Tom Gatewood; *Novelty Event*—Cliff Potts; *Team Combat Event*—Jack Douglas; *180-Lap-Mouse Race Clockwise*—James Freshman; *180-Lap-Mouse Race Counterwise*—Steve Marciel; and *180-Lap-Rat Race Clockwise*—John Morton.

Contest director Francis Stewart informed us of the results of the record trials held Sunday, May 14, at Bakersfield. The *Bakersfield Gas Model Plane Association* has a wonderful flying field, and the many contestants who have used it have enjoyed this large and unobstructed site. The thermals are usually wicked, and records topple very often when the big meets are held.

RESULTS OF RECORD TRIALS: *Class ½ A*—1. Jack Oxley 19:29.9 (record applied for); 2. Clifton Highman 12:40; 3. Elmer Achterberg 11:33.4; *Class A*—1. Tom Nishimoto 14:10.5; 2. Bill Farien 12:17.1; 3. Bob McCormick 12:03.5; *Class B*—1. George Kili 14:11.4; 2. F. L. Swaney 13:36.9; 3. Fred Bonar 9:26; *Class C*—1. F. L. Swaney 13:50.0; 2. Fred Bonar 13:48.2; and 3. Don Moorehouse 12:55.5.

The *La Mesa Airfoilers* and the *San Diego Airliners* held another of their quarterly inter-club contests May 21, and the La Mesa boys took home the much sought-after perpetual trophy. It is amazing how close these two clubs come out in total points. The *Airfoilers* won the meet by a scant 76 pts. this time, and the *Airliners* won it by 90 pts. last time. These scores actually are very close, considering that the total points of each club run over the 2,000 mark.

John Slater, Marv Becker, and Gene Marshall, of the *La Mesa club*, are one of the best stunt teams that we have ever seen. These boys work very closely while going through the flight pattern, and believe us, the job they do keeps the spectators as well as the other contestants on the edge of their seats. This team should give the competition at the coming Nationals a lot of trouble.

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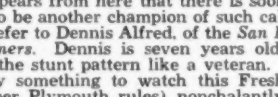

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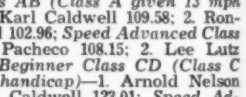

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Once in a while a very young flier steps into the limelight. Some of these youngsters are "naturals"; Davey Slagle was one of these lads. We watched him from the time he stepped out of the amateur class until he became the National Stunt Champion, a title he held three years in a row. It appears from here that there is soon going to be another champion of such caliber; we refer to Dennis Alfred, of the *San Diego Airliners*. Dennis is seven years old and flies the stunt pattern like a veteran. It is really something to watch this Freshman (as per Plymouth rules) nonchalantly executing maneuvers in the flying circle. Dennis is another of the very young hopefuls whom we have had the opportunity to watch, as he rounded out into a top-notch flier. If he is fortunate enough to attend the National and International contests this year, contestants and spectators alike will witness a very sharp exhibition by this pint-sized pilot.

Just before deadline time, we received another report from Northern California, via "Mom" Robbers. This was on the *Alameda Aero Modelers* Controline Contest held Sunday, May 21, another of the *Western Associated Modelers* Contests that are becoming more popular all the time. "Mom" and "Pop" Robbers keep a record of the flying time of every modeler who enters these meets, in order to put him in the correct classification. This means that they do all of the registering and recording at all *W.A.M.* contests, and then go home and make out the lengthy reports. Last year "Mom" started sending the contest reports in this fashion, with the idea that it gave the clubs a chance to keep track of their members' points whenever they flew in a *W.A.M.* contest. This seems to have gone over very big with the modelers.

The system used at these contests has been worked out very well. The flier is registered first via the typewriter method (so the record will be readable); the flight forms are color-coded so the judges and recorders can tell at a glance what is to be flown. The fliers all carry the *W.A.M.* insurance so everyone is protected. Looks like the Robbers family has gone all out to keep the Northern contests rolling smoothly. Those new flight forms should eliminate many of the headaches of the contestants, judges, and recorders. RESULTS: *Speed Beginner Class AB (Class A given 13 mph handicap)*—1. Karl Caldwell 109.58; 2. Ronald Kambestad 102.96; *Speed Advanced Class AB*—1. Jerry Pacheco 108.15; 2. Lee Lutz 107.40; *Speed Beginner Class CD (Class C given 7 mph handicap)*—1. Arnold Nelson 124.83; 2. Karl Caldwell 123.01; *Speed Advanced Class CD*—1. Gus Johnson 139.30; 2. J. C. Martin 124.17; *Speed Expert Class CD*—James Whitlatch 127.34; *Proto Speed Class A*—1. R. W. McReynolds 66.28; 2. M. L. Gagnon 74.7; *Proto Speed Class C*—1. W. C. Lamphear 70.32; 2. Bob Book 96.50; *Proto Speed Class D*—Jerome Guggemos 73.22; *Precision Beginner Class AB*—1. Eddie Ray King 277 pts.; 2. Alvin Kisling 256; *Precision Advanced Class AB*—1. Jack Douglas 304; 2. Truman Humphries 216; *Precision Expert Class AB*—1. James Freshman 318; 2. Ron Kambestad 312; *Precision Beginner Class CD*—1. Alvin Kisling 344; 2. Abe Branco 195; *Precision Advanced Class CD*—1. E. J. Alexander 349; 2. Steve Marciel 278; *Precision Expert Class CD*—1. Gail Eckstien 339; 2. James Freshman 307; *Precision Novice Event Class ABCD*—1. Jack Mansfield 85; 2. Eddie King, Jr. 85 (The first place tie in the novice event was decided by the highest of the other two attempts); *Flying Scale Class ABCD*—1. Bob Warner 304½; and 2. Herb Ross 288½.

The Naval Training Center at San Diego played host to Camp Pendleton, Naval Air Station, and Miramar Air Station in a model airplane meet, May 28. Competition was held in the stunt and scale events only. Several exhibition flights were made by members of the *San Diego Airliners*, *La Mesa Airfoilers*, and the *San Diego Aeroneers*. E. J. Brown of the *Aeroneers* flew his *Rudder Bug*. Brown's radio controlled flight was excellent, even though he had to

demonstrate his abilities in very windy weather. The take-off spot was the football field at N.T.C., which is bordered by barracks on three sides and the bay on the fourth side. After flying his ship through a series of spins, loops, and dives, E. J. brought the plane in to a beautiful landing very nearly in the center of the field where it had taken off. Many other exhibition flights were made by Cliff Potts, Marv Becker, Larry Goodale, John Slater, Gene Marshall, and a host of others.

WINNERS INTER-STATION MEET: *Open Stunt*—Charles Young; *Novice Stunt*—Dale Peters; *Flying Scale*—Joe Blackford.

See you here next month.

The Little Stinker

(*Continued from page 21*)

ules. She appeared in 15 shows in 1946, 30 shows in 1947 and 45 shows in 1948. Since her "show season" runs from April through September, 45 shows in a mere 7 months is almost two-a-week. To keep her dates, Betty often flew more than 2,000 miles on a week end.

These appearances were made in a Great Lakes biplane, one of the finest stunting planes ever designed (and the one with which Rodney Jocelyn won the International Championships in Miami last January). Betty named her Great Lakes the *Little Stinker*, a term of endearment mechanics used in her presence to avoid stronger language, (they were talking about the airplane—not Betty!).

After her fame had spread, Betty began casting about for a more picturesque stunting airplane, one a little more suited to her mere 5' 3" height and 100-lb. gross weight! And at this point our Plane of the Month enters the story. Its history actually goes back to a 15-year-old boy in Georgia building his own airplane out of spare parts: Curtis H. Pitts. This young man assembled pieces of Heath *Parasol* and Pientenpol *Scout* airplanes, plus a lot of his own woodwork, into a complete airplane. Curt Pitts is a little shy on what happened to this airplane but says that those who flew it—hated it! Pitts moved down to Jacksonville, Florida, and began the design and construction of a light, trim biplane suitable for acrobatics and cross-country flying.

The result was a tiny, neat biplane that caused a minor sensation wherever it appeared. It was completed in 1945, and this *Pitts Special No. 1* proved that an engineering degree and scientific wind tunnel tests are not essential for a sound, high-performance airplane. Pitts studied engineering through a correspondence course to obtain the basic technical knowledge needed for simple stress analysis and aerodynamic design. But he has proved that his eye and his own rules-of-thumb are as effective in solving design problems as a battery of electronic computing machines and a research laboratory.

The following year Pitts moved over to Gainesville, Florida, and went to work for Carl Stengel at Stengel Field. The Stengel Flying Service is an approved flight training school, charter service, and also Piper dealer for the Gainesville area. A second tiny biplane soon took shape and the compact little plane was completed New Year's Day, 1947. Daredevil "test pilot" on this *Special No. 2* was Phil Quigley, who had worked closely with Pitts throughout its construction. Quigley flew the little plane in several local air shows, where it attracted terrific interest and Pitts sold it to Jesse Bristow in April, 1947.

Early the following year Betty Skelton saw the airplane for the first time, and it was love at first sight. Bristow was in no mood for selling his prized possession, but persuasion and Betty's pert good looks and soft smile finally won out and she became its legal owner in August, 1948. In only a few hours Betty had utterly mastered the trim biplane, and after that, there was no matching her for precision acrobatics! She

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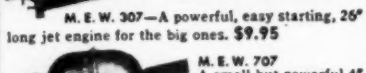

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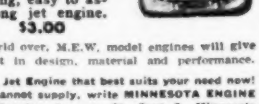

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promptly dubbed her prize the *Little Stinker, Too* (or II, if you want to be literal), but this was finally shortened to the picturesque *Little Stinker*, and now it usually is called *Lil' Stinker*. Betty's trade-mark quickly became a baby skunk, and to carry out the motif, she has collected nearly a hundred toy skunks of assorted shapes and sizes and uses the emblem wherever she goes.

Betty Skelton and *Lil' Stinker* burst into joint fame in the 1949 All-American Air Maneuvers at Miami early in January, 1949, when she won her second Women's International Acrobatic Championship in her new stunt plane. Largest crowds she has performed before, however, were those at the 1949 National Air Races at Cleveland, Ohio. She appeared daily in a precise exhibition of acrobatic flying and clinched her fame as World's Champion Woman Acrobatic Pilot.

There was only one little thorn in her happiness with her new stunt plane: it bore the unimaginative license number "NX 86401," which not only took up lots of painting space but gave a slightly dull atmosphere to the otherwise sleek racer. Betty asked the Civil Aeronautics Administration for a neater, more distinctive number. She was having *Lil' Stinker* modified and recovered and wanted to apply the new number in the process. The CAA, in a cooperative mood, finally located "N22E" in its unused catalog of numbers and told her she was welcome to it. But after receiving this good news, Betty suddenly remembered that she had been filling out forms and making photostats for various government agencies, both here and abroad, preparatory to a trip to the British Isles, and all these official papers listed her plane as NX 86401! (What fun she would have had appearing in England with airplane No. N22E, of which nobody in official circles had heard!) What to do? Back she came to the CAA asking them to please hold her special N22E number aside for a few months and please—don't give it to anybody else! The CAA, even more cooperatively, agreed to this proposition and off she went with *Lil' Stinker* (NX 86401—that is!) on the Queen Mary for England. Her tour of the British Isles was a smashing success, particularly her appearance at the International Air Pageant. She crossed the Irish Sea in the diminutive biplane to set a new record for the smallest airplane to make the over-water leap. Back home again with *Lil' Stinker* intact, she found her N22E number still waiting for her, and it was promptly applied, the number the ship bears today.

The *Pitts No. 2* was originally powered by a Continental C85-12FJ of 85 hp, but Betty wanted more power for her Miami Air Races appearance this year and she had a Continental C90-8FJ installed, giving 90 hp. Both engines use fuel injection equipment to permit continuous operation of the engine in inverted or accelerated flight. The plane was strengthened last fall by adding thicker gauge aluminum alloy skin along the leading edge of the top wing.

The plane is combination wood, metal and fabric covering and weighs only 568 lbs. empty. The addition of 19 gallons of fuel, 4-1/2 quarts of oil and Betty Skelton give it a gross weight of 800 lbs. An Aeromatic prop is used to give the plane full thrust under the sudden bursts of throttle used in acrobatics.

Some idea of the amount of work required to give *Lil' Stinker* that beautiful high-gloss finish can be gained from a list of the applications used: 6 coats of clear dope, 4 coats of silver dope, and 8 coats of color-pigmented dope, or a mere 18 coats of dope on that fabric! The plane has a span of 16' 9", is 14' 8" long, and stands only 5' 4" high. It cruises at 135 mph.

Betty Skelton insists that acrobatics are not merely fancy flying but are, in fact, precision flying at its best. Every instant she is going through her display, she is following in minute detail her prearranged plan. But it is still tough flying, and Betty wears a turkish towel around her waist with two safety belts to hold her tight in the seat. She wears a conventional back pack parachute but one especially designed and made for her in a small, tight-fitting size.

Betty is not merely an expert 90-hp pilot for she recently gave an exhibition flight in the P-51 Mustang racer of Woody Edmondson. But the flight didn't turn out as expected. At a special "Betty Skelton Day" air show at Tampa, Betty went aloft in the fast fighter and was averaging 421.9 mph when the engine blew up in mid-air. Edmondson, like any veteran pilot, prayed for Betty to jump: you can always get another airplane! But Betty nosed across country and dead-sticked into McDill Air Force Base in a perfect landing, showing not only plenty of sky-going courage but excellent flying skill as well.

Curtis Pitts has turned his attention to racing airplane design and is now at work on his third. Phil Quigley flew the Pitts *New Special* in the 1950 Continental Trophy Race at Miami last January and came out with fourth place. But the character of the competition is clear from the fact that Quigley nosed-out veteran Bill Brennand in his *Buster* racer, so the Pitts Racer is worth watching closely in the future.

As secure as Betty Skelton may be ensconced as World's feminine acrobatic champion, she has some stiff competition coming up in next year's meet. Pitts is nearing completion on his No. 3 *Special* for Miss Caro Bailey, who came in second to Betty in her 1949 acrobatics competition. Miss Bailey's version of the neat biplane stunt plane, however, is powered by a Lycoming 0-290-C engine of 125 hp, which should make her ship climb like a rocket. A special pressure-diaphragm type carburetor is used for inverted flight. Pitts and Quigley muse that a couple of "Baby Jato" units, together with this power, should permit the new airplane simply to take off straight up, from an inclined launching platform!

Pitts and Quigley are not interested in getting into the aircraft manufacturing business. The thing is purely a hobby and done for the love of the game. None, of course, are opposed to collecting some race prize money to help defray costs but the combination are old-timers who simply enjoy their work. But there is one question that mustn't be mentioned around these three or Betty Skelton herself, since it comes up on the average of once a day: "Is that airplane a modified Knight *Twister*?" Once and for all the answer is: "NO!" But no one who has seen Betty Skelton and her *Lil' Stinker* perform will deny that the pilot-and-plane team is a "twister" of precision and beauty and are forever grateful for the experience of seeing truly magnificent flying in a truly neat airplane.

Mexican Veloz

(*Continued from page 15*)

Take your time with the wings; weight can be saved by duplicating the following procedure. Lightly sand the 1/20" sheet balsa; then cut the two left, two right, and center section panels. Steam each panel separately and work the proper camber into it with fingers. Rub in thinned clear dope with thumb and forefinger, working each side of each individual wing panel at the same time. This method will enable one, if care is exercised, to retain the airfoil camber without need of unsightly ribs. Two coats of dope should be applied in this manner. The camber is clearly shown in accompanying photo of author's model. Allow doped wings to dry for at least an hour, checking them often; should the camber tend to flatten, mold with the fingers. Perseverance will pay off at this point with good looks and fine flights later.

Cut notch in rear of fuselage for the elevators and install same at zero degrees incidence after they have been cut (in one piece), lightly sanded, and doped. Here again, as well as on the rudder, dope with thinned clear dope by rubbing gently between fingers. Cement rudder in place after insignia of red, white, and green strips of

tissue have been doped in place (note color code on drawings).

The writer took several hours out at this point to paint the insignia (modern Mexican insignia has changed—use the old type as shown for authenticity) on the wings and rudder; however, should you feel unable to do so, use cut-to-shape bits of colored tissue; place on wings at both tips, on top surface of top wing and beneath bottom wings.

By this time the landing gear struts should be secure, so complete landing gear with a 1/16" pine spreader bar and the upright "V" which is bent from .020 wire, cemented in place at the fuselage and bound and cemented to spreader bar. Wheels may be purchased; however, the ones illustrated were handmade with light aluminum discs. Install with appropriate small washers on an .020 steel wire axle which is bound and cemented to the center of the spreader bar. Note that the shock absorbing system, thus automatically provided, is much like those used on many real aircraft (this *Microplano Veloz* included) during the early days of aviation.

Wings, beginning with the center section, are now ready to be attached. Note that the points of strut-attachment are indicated on plans by dots surrounded by small circles. First, attach the center section. If your work has been accurate (and later flights will prove or disprove your craftsmanship), the center section will be *without* incidence.

Next attach both panels of bottom wing. Block fuselage in place on your bench, and raise both wingtips 1/4" for dihedral. The interplane struts are 1/16" x 3/16" strips of pine which have been sanded to streamlined cross section. Note that these struts are raked away at each end, following the old practice (which was, in fact, necessitated by the somewhat primitive construction and the maze of connecting wires). Cement two interplane struts to top of each bottom wing panel in places indicated on plans. Notice that the forward struts are about 1/2" inboard of the rear struts—the one outstandingly unusual characteristic of the Mexican *Microplano Veloz* pursuit plane. Struts splay outward slightly, about 1/2", then block the struts in place while they dry. Cement each top wing panel in place, block well, and allow to dry for one hour.

Completion is near at hand; bend tailskid from .010 wire and cement in place. Fix the *Campus A-100* CO2 engine securely in place and hold the tank in position by means of a rubber band around the fuselage. This method of tank attachment allows the tank to be shifted fore and aft for correct flight balance; moreover, the entire engine and tank may be quickly and easily removed for installation in another model without any structural repairs or inconveniences.

A windshield will add detail as will mahogany-doped struts, black landing gear and tires, tailskid and radiator. The writer went so far as to install a Vickers machine gun forward and along the right side of the fuselage, though he was unable to determine whether or not any *Microplano* originals were so armed.

Follow the usual precautions when testing and flying this little model. Construction of the ship shown occupied three evenings, or to be more exact—three consecutive nights from 8 p.m. until close to breakfast time the following morning. The time spent, however, was well worth the effort for the result is the model shown—an unusual scale model if ever there was one. Flights are excellent, the plane less the engine weighing only 3/4 oz.

The Mexican *Microplano Veloz* was an extremely good ship for its day, yet it is virtually unknown now, a plane seen only in the oldest of source books until brought forth in the accompanying simply built and fine flying scale model. Incidentally, rubber power may be used equally as well as CO2 power, and the lightness of the model will assure you a beautiful "floater."

You midget gas bugs (those with ½ A engines) might double the size of these plans—you'd then have a fine free-flighter and one that would attract attention wherever flown.

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Wee Floater

(*Continued from page* 31)

tween each coat. Check the edges with your finger to see that they are smooth. A finger grip is cut into either side of the wing when this stage is reached; this is indicated by the dashed line on the wing outline. Cut out carefully and sand using your fingers to check the size. When the grips feel comfortable to hold, stop. Cut away as little as possible since the cutout is made to prevent breaking the trailing edge when launching.

Test gliding is done in the following manner. Add clay to the nose section until the glider balances at the point shown. Launch the model straight away from you—it should fly straight with a slight stall. Warp the rudder for a right turn and test again. A smooth, steady flight should occur.

The indoor version is launched by grasping the finger grip on the fuselage and throwing the glider straight out from you. Do not bank it. Warp the right wing for a slight wash-in. With these adjustments the model will climb rapidly, go into a tight roll over and proceed in a slow glide of about 12' in diameter.

Though the outdoor version is adjusted in the same manner it is gripped differently. Hold the model by the fuselage grip using your thumb and fourth finger. Your index and middle fingers will fit into the wing grip holes. If you are not accustomed to this method of holding a glider, take a few low-power practice throws to get the feel of the launch. You will find that launching tends to be more consistent using this method.

As an added hint, trim your glider so that it is flying on the verge of a stall. This produces a float which adds seconds to the stop watch reading.

Public Recreation Areas

(*Continued from page* 17)

heavily populated areas for controline flying was highly desirable. It was determined that a motor (.60 cu. in. displacement) on which a moderate-size propeller is installed and to which a muffler is attached, will produce 69 (plus or minus 2) decibels of sound at a distance of 65', regardless of the location of the motor. This distance makes it barely possible to hear the motor at a distance of 250' (plus or minus 50'), such variation in distance depending primarily on background noise present at the location of the listener. Using this information and following the advice of the Advisory Committee, the City built its first controline field in the Griffith Park Area. The field is entirely surrounded with 6' chain link fence and consists of two 70' circles and one 50' circle, entirely grassed. Each circle has a concrete take-off strip 3' wide, extending 90° around the circle. The use of mufflers on this field has been satisfactory to both fliers and near-by residents of the area; of course, the small motors go unmuffled. The following rules and regulations were adopted by the Department to govern U-control fields.

RULES AND REGULATIONS FOR FLYING OF MODEL AIRCRAFT. 1. All motors must be equipped with mufflers which reduce noise to an approved level, except on fields where mufflers are not deemed necessary. No jets will be allowed.

2. All flying must be done on designated circles or areas laid out by Department personnel.

3. All flying equipment must be in first-class condition, and at any time available for checking and inspection by Department personnel. All planes, control wires, and handles will be subjected to the following tests on the pull stand: Sport flying 15 G (15 x weight of model); Stunt flying 15G (15 x weight of model); Speed flying 20G (20 x weight of model).

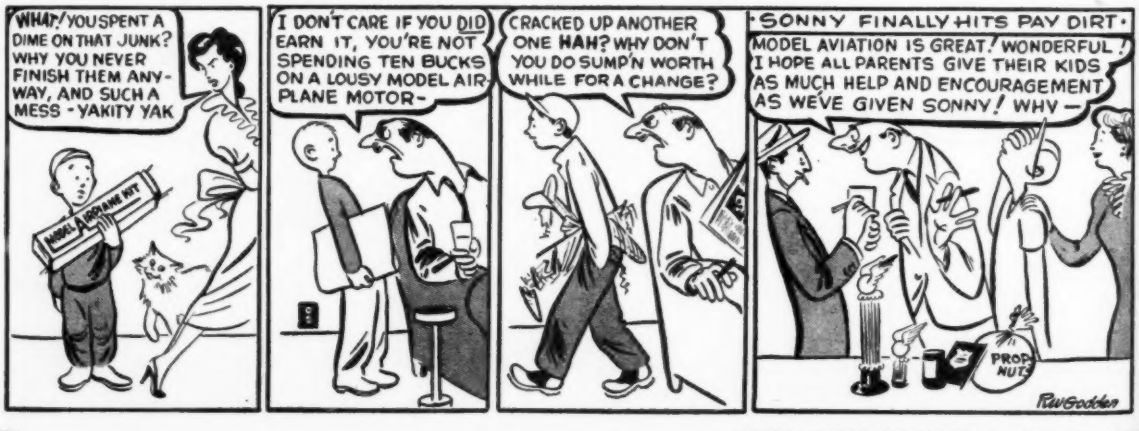
4. Spectators will not be permitted closer than 100' of the perimeter of the flying circle unless protection is afforded by screens or fences. Flying must be suspended if spectators do not conform to the above.

5. Flying areas must be policed. All debris must be cleaned up immediately after a crack-up. All broken props, nuts, bolts, rags, and other debris must be removed from the area. Proper containers will be provided in immediate vicinity.

6. All competitive flying must be held under the rules adopted by the AMA or the *California Association of Model Clubs.*

7. Flying may be conducted in the following areas under the jurisdiction of the Recreation and Park Department.

Plans are now underway for additional controline areas throughout the city.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Index to ADVERTISERS IN THIS ISSUE

A-J Aircraft Co. 1
Ace Model Shop 53
Ace Products 33
All American Model Motor Exchange 51
All-Nation Hobby Shop 53
Allyn Sales Co. 55
America's Hobby Center, Inc. 4, 5, 6, 7, 43
Mel Anderson Mfg. Co. 38
Arnold & Fox Engineering Co. 44
Atwood Manufacturing Co. 49

Berkeley Model Supply 56
Burden's Hobby Lobby 53
Burgess Handicraft Stores 53
Burk & Co. 53
Busy Workshops 44
Buzz & Doug's Hobby Shop 53

Cal Aero Technical Institute 3
Carter Craft Models 48
Cleveland Model & Supply Co. 51, 53
Comet Model Hobbycraft, Inc. 39
Consolidated Model Engineering Co. 51
Crescent Model Shop 37
Crosby's Hobby Centre 53

Dealer Directory 53
Duro-Matic Products Co. ..... 52, 4th Cover
Dyna-Model Products Co. 43

East Side Hobbies 53
Edward's Hobbies 53

Fischer's Hobby Service 53
Forster Brothers 36
Four Star Model Builders Supply 40
Richard Francis Hobby Supplies 53
Francisco Laboratories 45

General Sales Service 53
Good's Hobby Shop 53
Gotham Hobby Corp. 46

Heckman's Hobby Shop 53
Herkimer Tool & Model Works, Inc. 34, 35
Highway Hobby House 53
Hillside Hobby Shop 53
Hobby Bobby's 53
Hobby & Cycle Shop, The 53
Hobby Enterprises, Inc. 53
Hobby Shop, The 53
Howie's Hobby House 53

Jarvis Battery & Electric Co. 50
Junior Aeronautical Supply Co. 42

K & B Manufacturing Co. ..... 3rd Cover
Klein's Hobbycraft Shop 53

Mac's Model Shop 53
Minnesota Engine Works 50
Model Craft Hobby Shop 53
Model Railroad Shop, The 53
Mod-Ad Agency, The 4
Mod Kraft Co. 42
Monogram Models 48

Northeast Hobby Center 53

Outboard Motor Brackets Co. 33

PAL Engineering Ltd. 42
D. C. Parker 49
Pico Model Co. 53
Polk's Model Craft Hobbies 53
Premium Manufacturing Co. 41

Quaker City Hobby Shops, Inc. 53

Ray's Bike & Key Shop 53
Red's Hobbycraft Models 53
Bob Roberts 9
Ruth, Howard E. 53

Scientific Model Airplane Co. 47
Scranton Hobby Center 50
"Jay" Simmons 53
Sims Bros. Cycle Shop 53
Victor Stanzel & Co. 49
Sullivan Products 40
Super-Cyclone, Inc. 3
Swift Model Shop 53

Telselco 43
Testor Chemical Co. ..... 2nd Cover
Todd's Model Shops 53
Top Flite Models, Inc. 8

Vic's Hobby Supply 53

Western Model Distributors 46
Workbench, The 53

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AUGUST 1950
MODEL AIRPLANE NEWS

The race car track did not provide as many problems as the controline field. A site in the Elysian Park Playground was selected and a standard cable race car track was constructed. The track, of attractive design and fenced completely including working pits, is operated in cooperation with the *Elysian Park Race Car Club* which assists the City in providing supervision for the activity. At the present time a 90° rail track is being constructed on the crash wall of the cable track, enabling both cable and rail races. Plans are under way for the construction of a thimbledrome track adjacent to the cable track. The race car facilities are open every day and several nights durin the week.

At the present time the main source of worry to the modelers of the area is a suitable free flight field. The free flight field at Rosecrans and Western Avenues, operated by the *Los Angeles Aero Modelers*, is fast becoming a "has been." Industrial plants and others are moving in to squeeze the free flight modeler out. Accordingly, the committee in cooperation with the Recreation Department, are attempting to find a desirable site which could possibly be developed by the Recreation Department. At present, preliminary plans are going forward for a free flight area to be incorporated in a 2,500-acre tract which is being acquired from the Federal Government in a flood control area.

In addition, the Department is striving for similar success in other fields such as model boats, trains, etc. The entire success of such a program, as now being carried out in Los Angeles, depends upon the modelers themselves working with city officials for the needs of modelers in the area.

Flash

(*Continued from page 7*)

more powerful engines accommodates the first three of these drawbacks and keeps the performance at least the same and usually better. But the landing speed is unaffected by the more powerful engines since they are throttled for landing, and the landing speed of all these aircraft has increased. Reverse-pitch propellers handles the resulting increase in length of landing roll but passengers are simply going to have to get used to "hot" landings in these new airplanes.

ALTHOUGH THE International Air Transport Association has done a magnificent job in reducing the amount of "red tape" required in international air travel, some complexities still remain. For example, Turkey requires that international aircraft documents be filled out in Turkish! Iraq requires that all passengers have special "transit visas" in order to simply pass through Basra on their way from one country to another. Australia requires special passenger address information. Canada requires special cargo lists and descriptions, and Brazil has burdensome documentation. IATA is working steadily on these problems and the day is not far off when the international air traveler will be able to go and come almost as a world citizen.

THE BRITISH may resort to flight refueling in their transatlantic operation of the DeHavilland *Comet* jet transport. DeHavilland engineers have conferred with engineers of Flight Refueling on the technical problems involved. The desirability of Flight Refueling is no reflection on the airplane design or fuel capacity but stems from the existing requirements for "holding" and "alternate" flight times. These requirements insist that the airplane carry enough fuel to make the projected flight against expected headwinds, to be diverted to the farthest alternate airport established for the destination and then to remain aloft for at least 45 mins. over the alternate airport. Against the headwinds of the North Atlantic, the long distances to alternate airports and the rapid fuel consumption of the turbojet engines, the *Comet* must carry almost as much "extra" fuel as is required to make the flight in clear weather. Flight Refueling has developed a plan in which the *Comet* would be refueled in the air on a London-New York flight first when 250 miles out in the Atlantic from Shannon, Ireland, when 2,400 gallons would be transferred, and secondly when over Gander, Newfoundland, when about 2,000 gallons would be taken aboard. The difference in North Atlantic winds is clear from the fact that only the one refueling over Gander would be required to make the New York-London flight. The Westbound flight would take 9-1/2 hours, the Eastbound flight only 7-1/2 hours.

THE BRITISH have recaptured the 1,000 km. (621.4 miles) speed record from the U.S. Sqdrn. Leader James Cooksey flew a Gloster *Meteor 8* over the course at an average speed of 512 mph to eclipse the former record of 464 mph held since June, 1946, by Lieut. Henry A. Johnson, USAF, in a Lockheed P-80. The British also hold the 100 km. (62.14 miles) speed record at 605.23 set by John Derry in the DeHavilland DeH 108 swept-wing research airplane. But the U.S.'s own Maj. Richard L. Johnson still holds the all-out speed record (over a distance of one mile) of 670.981 mph. These speed records are expected to fall at the 1950 National Air Races, where jet fighters will compete over a 100-km. course in straight-a-way dashes. We predict a world's speed record of 710 mph and a 100-km. course record of 650 mph at the Races this year by North American *Sabre* fighters.

THE PLANE MANY private flying enthusiasts are hailing as "the answer" to the problem, the Bollinger-Koppen *Helioplane* now in initial production, will be sold under the same kind of service policy now used in television sales: the purchaser will receive free maintenance and repair on his airplane. It is this feature that makes the $7-9,000 price tag on the airplane not readily comparable to that of other four-place airplanes. When a purchaser buys a *Helioplane*, all he will ever have to do is buy gas and oil for it. All inspections, modifications, repairs and maintenance will be handled by a local service representative.

THE POWER of industry has found its way into the use of a romantic name and we will no longer hear of the Fouga *Cyclone*. Wright Aeronautical Corporation, about whose *Cyclone* engine name fame nothing need be added, filed an objection to the use of the name with Establissements Fouga & Cie., d'Aire-sur-l'Adour, France, and the little Fouga *Cyclone* is now the Fouga *Sylphe*, we are sad to report. Fouga has designed a clipped-wing version known as the *Cyclope*, powered by the same Turbomeca *Pimene* jet engine as the *Sylphe*. Fouga also is developing a two-seater, the *Gemeaux*, to be powered by a more powerful Turbomeca jet engine of 440—660-lb. thrust.

AIR FORCE has released some details on the nature of the equipment to be installed at the new Air Engineering Development Center now under construction at Camp Forrest, Tenn. The Center, under the command of Maj. Gen. Frank O. Carroll (who was in charge of Wright Field developments for many years), will concentrate principally on testing aircraft power plants. The first unit of equipment scheduled for completion is a high-altitude engine test facility, which will make use of equipment captured at the B.M.W. engine laboratory in Germany. Eventually the Center will have a supersonic wind tunnel and a jet propulsion tunnel that will enable it to test engines at speeds from 1,000 to 7,500 mph. At first conventional jet engines will be tested, but by 1955 when the center is in full operation, it is expected to be testing atomic energy engines. The official name of the facility is Arnold Engineering Development Center, in honor of the late General Henry H. "Hap" Arnold, wartime chief of the Air Forces.

IF YOU THINK the next war looks horrible enough already, you will be further interested to know that Pentagon officials have revealed a "baby" atom bomb capable of being carried by fighters! No details are available, of course, but this changes the picture somewhat from the long-held conviction that only huge bombers could transport the bomb. Now, apparently, it can be slung under modern jet fighters and delivered at 600 mph from low altitudes!

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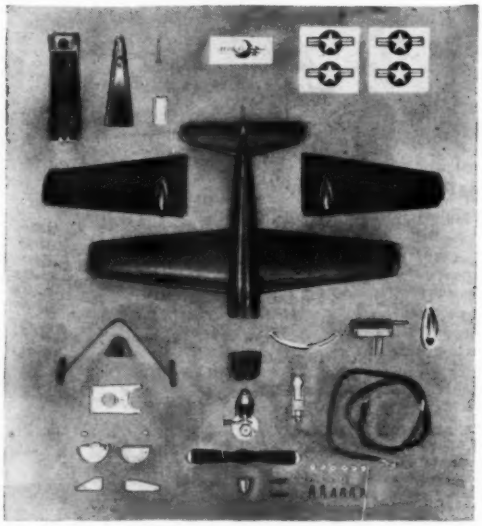

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"MINI-ZILCH"

20" Wingspan — For .020 to .049 Engines

This stunt controliner kit was designed for the midjet engines by Jim Saftig. It includes die-cut fuselage sides; ribs; plywood parts; wing and tail surfaces; full length spar; formed landing gear; wheels; and complete hardware for the "U-Control" system! **$1.25**

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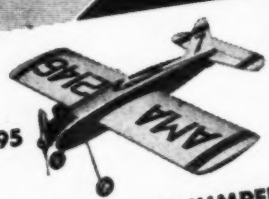

"SENOR' PUDDLE-JUMPER"

25" Wingspan — For .074 to .23 Engines

Designed for quick easy construction, the fuselage is cut-out ready for assembly; leading and trailing edges are shaped and notched; ribs, plywood parts and tail surfaces are die-cut; and the "U-Control" system, formed gear, rubber wheels; bolts; and bubble canopy are included!

THE "KEY-DET"

18" Wingspan — For .074 to .099 Engines

This beautiful model opens Team Racing to the owners of Class "A" engines. The complete kit includes a fully carved and hollowed fuselage; rubber wheels with metal hubs; shaped wing surfaces; metal landing gear; fuel tank; and complete hardware, including the genuine Jim Walker "U-Control" system! **$2.95**

D-E AEROTROL

Now Available in Kit Form

ONLY $19.95 COMPLETE (less tubes and batteries)

YOU can now assemble your own radio control unit from completely fabricated parts. A pair of pliers, screwdriver, and soldering iron are the only tools required. Here is what you get in the complete kit:

TRANSMITTER: Stamped and formed chassis with all holes punched; all necessary electronic components, resistors, condensers, coils and chokes, ready for installation; keying switch, soldering lugs and hardware; plywood case, color coded wiring, plus the dipole antenna wire.

RECEIVER: Drilled bakelite receiver base with condenser and all eyelets attached, super-sensitive D-E Relay ready for installation; all electrical components, condensers, resistors, coils, potentiometer and chokes, ready for installation; all necessary contacts, and color-coded wiring.

ESCAPEMENT: Coil assembled to ready made frame, all other parts ready for assembly.

FLIGHT PROVEN!

D-E AEROTROL is light, small, and compact. Single channel installation can be made in models as small as 36" wingspan. This set will easily operate over a 2½ mile range. Frequency can be adjusted between 50 and 54 mc. for multiple channel installations.

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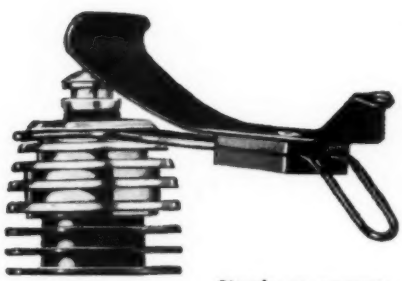
Made of a new alloy material, for higher conductivity and low battery drain, this new K & B Glow Plug has electronic welded construction, genuine platinum element and a completely new type of insulation to stand terrific heat.

Months of research and testing have proved to us that the new K & B Glow Plug is the finest in the field. Popularly priced.



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K&B SLIP ON CONNECTOR

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Now for the first time a glow plug to battery connector to fit all makes of glow plugs on any engine from .020 to .074 and some .099's.

Simple to operate, the new K & B Slip On Connector is designed for maximum efficiency, and gives a positive connection to insure easier starting.

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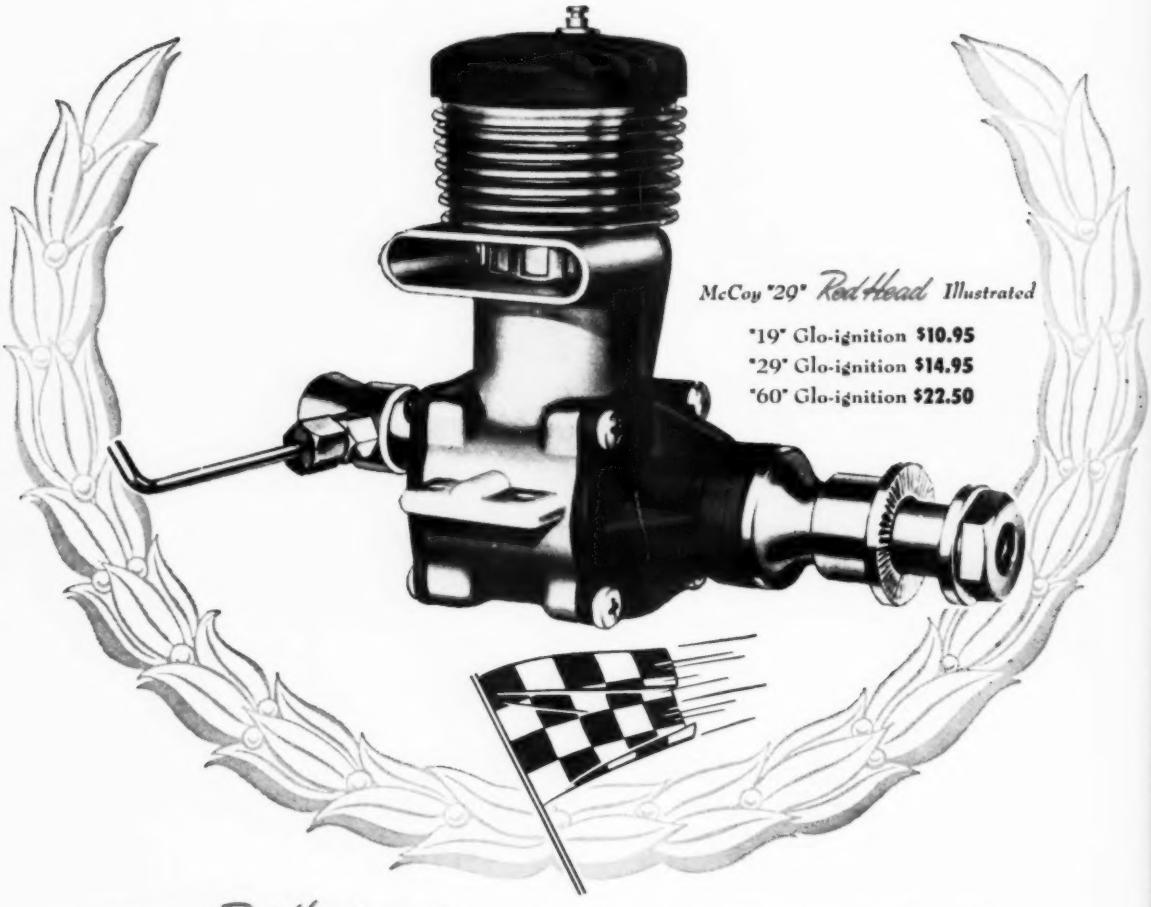

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The McCOY Red Head's World Record breaking introduction April 1946, changed the model builders conception of what a model engine must do. The 1950 Red Head's have been improved inside and out. You will never know how wonderful engine performance can be, until you fly a 1950 McCOY Red Head !

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